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Preaward Compliance Review Report for All Applicants and Recipients Requesting EPA Financial Assistance

Note: Read Instructions before completing form.

I. A. Applicant/Recipient (Name, Address, City, State, Zip Code)

Name:

Address:

City:

State: Zip Code:

B. DUNS No.

II. Is the applicant currently receiving EPA Assistance? ☒ Yes ☐ No

III. List all civil rights lawsuits and administrative complaints pending against the applicant/recipient that allege discrimination based on race, color, national origin, sex, age, or disability. (Do not include employment complaints not covered by 40 C.F.R. Parts 5 and 7.)

IV. List all civil rights lawsuits and administrative complaints decided against the applicant/recipient within the last year that allege discrimination based on race, color, national origin, sex, age, or disability and enclose a copy of all decisions. Please describe all corrective actions taken. (Do not include employment complaints not covered by 40 C.F.R. Parts 5 and 7.)

V. List all civil rights compliance reviews of the applicant/recipient conducted by any agency within the last two years and enclose a copy of the review and any decisions, orders, or agreements based on the review. Please describe any corrective action taken. (40 C.F.R. § 7.80(c)(3))

VI. Is the applicant requesting EPA assistance for new construction? If no, proceed to VII; if yes, answer (a) and/or (b) below.

☐ Yes ☒ No

a. If the grant is for new construction, will all new facilities or alterations to existing facilities be designed and constructed to be readily accessible to and usable by persons with disabilities? If yes, proceed to VII; if no, proceed to VI(b).

☐ Yes ☐ No

b. If the grant is for new construction and the new facilities or alterations to existing facilities will not be readily accessible to and usable by persons with disabilities, explain how a regulatory exception (40 C.F.R. 7.70) applies.

VII. Does the applicant/recipient provide initial and continuing notice that it does not discriminate on the basis of race, color, national origin, sex, age, or disability in its program or activities? (40 C.F.R. 5.140 and 7.95)

☒ Yes ☐ No

a. Do the methods of notice accommodate those with impaired vision or hearing?

☒ Yes ☐ No

b. Is the notice posted in a prominent place in the applicant's offices or facilities or, for education programs and activities, in appropriate periodicals and other written communications?

☒ Yes ☐ No

c. Does the notice identify a designated civil rights coordinator?

☒ Yes ☐ No

VIII. Does the applicant/recipient maintain demographic data on the race, color, national origin, sex, age, or handicap of the population it serves? (40 C.F.R. 7.85(a))

☒ Yes ☐ No

IX. Does the applicant/recipient have a policy/procedure for providing access to services for persons with limited English proficiency? (40 C.F.R. Part 7, E.O. 13166)

☒ Yes ☐ No

- X. If the applicant is an education program or activity, or has 15 or more employees, has it designated an employee to coordinate its compliance with 40 C.F.R. Parts 5 and 7? Provide the name, title, position, mailing address, e-mail address, fax number, and telephone number of the designated coordinator.

--

- XI. If the applicant is an education program or activity, or has 15 or more employees, has it adopted grievance procedures that assure the prompt and fair resolution of complaints that allege a violation of 40 C.F.R. Parts 5 and 7? Provide a legal citation or Internet Address for, or a copy of, the procedures.

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For the Applicant/Recipient

I certify that the statements I have made on this form and all attachments thereto are true, accurate and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law. I assure that I will fully comply with all applicable civil rights statutes and EPA regulations.

A. Signature of Authorized Official

B. Title of Authorized Official

C. Date

Reginald W Tupponce

Tribal Administrator

03/25/2022

For the U.S. Environmental Protection Agency

I have reviewed the information provided by the applicant/recipient and hereby certify that the applicant/recipient has submitted all preaward compliance information required by 40 C.F.R. Parts 5 and 7; that based on the information submitted, this application satisfies the preaward provisions of 40 C.F.R. Parts 5 and 7; and that the applicant has given assurance that it will fully comply with all applicable civil rights statutes and EPA regulations.

A. *Signature of Authorized EPA Official

B. Title of Authorized Official

C. Date

*** See Instructions**

Instructions for EPA FORM 4700-4 (Rev. 06/2014)

General. Recipients of Federal financial assistance from the U.S. Environmental Protection Agency must comply with the following statutes and regulations.

Title VI of the Civil Rights Acts of 1964 provides that no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. The Act goes on to explain that the statute shall not be construed to authorize action with respect to any employment practice of any employer, employment agency, or labor organization (except where the primary objective of the Federal financial assistance is to provide employment). Section 13 of the 1972 Amendments to the Federal Water Pollution Control Act provides that no person in the United States shall on the ground of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under the Federal Water Pollution Control Act, as amended. Employment discrimination on the basis of sex is prohibited in all such programs or activities. Section 504 of the Rehabilitation Act of 1973 provides that no otherwise qualified individual with a disability in the United States shall solely by reason of disability be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. Employment discrimination on the basis of disability is prohibited in all such programs or activities. The Age Discrimination Act of 1975 provides that no person on the basis of age shall be excluded from participation under any program or activity receiving Federal financial assistance. Employment discrimination is not covered. Age discrimination in employment is prohibited by the Age Discrimination in Employment Act administered by the Equal Employment Opportunity Commission. Title IX of the Education Amendments of 1972 provides that no person in the United States on the basis of sex shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance. Employment discrimination on the basis of sex is prohibited in all such education programs or activities. Note: an education program or activity is not limited to only those conducted by a formal institution. 40 C.F.R. Part 5 implements Title IX of the Education Amendments of 1972. 40 C.F.R. Part 7 implements Title VI of the Civil Rights Act of 1964, Section 13 of the 1972 Amendments to the Federal Water Pollution Control Act, and Section 504 of The Rehabilitation Act of 1973. The Executive Order 13166 (E.O. 13166) entitled; "Improving Access to Services for Persons with Limited English Proficiency" requires Federal agencies work to ensure that recipients of Federal financial assistance provide meaningful access to their LEP applicants and beneficiaries.

Items "Applicant" means any entity that files an application or unsolicited proposal or otherwise requests EPA assistance. 40 C.F.R. §§ 5.105, 7.25. "Recipient" means any entity, other than applicant, which will actually receive EPA assistance. 40 C.F.R. §§ 5.105, 7.25. "Civil rights lawsuits and administrative complaints" means any lawsuit or administrative complaint alleging discrimination on the basis of race, color, national origin, sex, age, or disability pending or decided against the applicant and/or entity which actually benefits from the grant, but excluding employment complaints not covered by 40 C.F.R. Parts 5 and 7. For example, if a city is the named applicant but the grant will actually benefit the Department of Sewage, civil rights lawsuits involving both the city and the Department of Sewage should be listed. "Civil rights compliance review" means any review assessing the applicant's and/or recipient's compliance with laws prohibiting discrimination on the basis of race, color, national origin, sex, age, or disability. Submit this form with the original and required copies of applications, requests for extensions, requests for increase of funds, etc. Updates of information are all that are required after the initial application submission. If any item is not relevant to the project for which assistance is requested, write "NA" for "Not Applicable." In the event applicant is uncertain about how to answer any questions, EPA program officials should be contacted for clarification. * Note: Signature appears in the Approval Section of the EPA Comprehensive Administrative Review For Grants/Cooperative Agreements & Continuation/Supplemental Awards form.



EPA KEY CONTACTS FORM

OMB Number: 2030-0020
Expiration Date: 06/30/2024

Authorized Representative: *Original awards and amendments will be sent to this individual for review and acceptance, unless otherwise indicated.*

Name:	Prefix: Mr.	First Name: Reginald	Middle Name:
	Last Name: Tupponce		Suffix:
Title:	Tribal Administrator		
Complete Address:			
Street1:	13476 King William Rd		
Street2:			
City:	King William	State:	VA: Virginia
Zip / Postal Code:	23086	Country:	USA: UNITED STATES
Phone Number:	8045350562	Fax Number:	
E-mail Address:	admin@umitribe.org		

Payee: *Individual authorized to accept payments.*

Name:	Prefix: Ms.	First Name: Terry	Middle Name:
	Last Name: Stone		Suffix:
Title:	Financial Director		
Complete Address:			
Street1:	13476 King William Rd		
Street2:			
City:	King William	State:	VA: Virginia
Zip / Postal Code:	23086	Country:	USA: UNITED STATES
Phone Number:	8045350558	Fax Number:	
E-mail Address:	financial@umitribe.org		

Administrative Contact: *Individual from Sponsored Programs Office to contact concerning administrative matters (i.e., indirect cost rate computation, rebudgeting requests etc).*

Name:	Prefix: Ms.	First Name: Terry	Middle Name:
	Last Name: Stone		Suffix:
Title:	Financial Director		
Complete Address:			
Street1:	13476 King William Rd		
Street2:			
City:	King William	State:	VA: Virginia
Zip / Postal Code:	23086	Country:	USA: UNITED STATES
Phone Number:	8045350558	Fax Number:	
E-mail Address:	financial@umitribe.org		

EPA KEY CONTACTS FORM

Project Manager: *Individual responsible for the technical completion of the proposed work.*

Name: **Prefix:** Ms. **First Name:** Leigh **Middle Name:**

Last Name: Mitchell **Suffix:**

Title: Environmental & Cultural Protection Director

Complete Address:

Street1: 13476 King William Rd

Street2:

City: King William **State:** VA: Virginia

Zip / Postal Code: 23086 **Country:** USA: UNITED STATES

Phone Number: 8045350561 **Fax Number:**

E-mail Address: environment@umitribe.org

Project Narrative File(s)

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BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 02/28/2022

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Enhanced Air Quality Monitoring for Communities	66.034	\$	\$	\$ 449,988.00	\$ 0.00	\$ 449,988.00
2.						
3.						
4.						
5. Totals		\$	\$	\$ 449,988.00	\$ 0.00	\$ 449,988.00

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SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
	Enhanced Air Quality Monitoring for Communities				
a. Personnel	\$ 146,016.00	\$	\$	\$	\$ 146,016.00
b. Fringe Benefits	37,964.00				37,964.00
c. Travel	17,200.00				17,200.00
d. Equipment	114,000.00				114,000.00
e. Supplies	27,000.00				27,000.00
f. Contractual	31,900.00				31,900.00
g. Construction					
h. Other	35,000.00				35,000.00
i. Total Direct Charges (sum of 6a-6h)	409,080.00				\$ 409,080.00
j. Indirect Charges	40,908.00				\$ 40,908.00
k. TOTALS (sum of 6i and 6j)	\$ 449,988.00	\$	\$	\$	\$ 449,988.00
7. Program Income	\$ 0.00	\$	\$	\$	\$ 0.00

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SECTION C - NON-FEDERAL RESOURCES				
(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
8. Enhanced Air Quality Monitoring for Communities	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
9.				
10.				
11.				
12. TOTAL (sum of lines 8-11)	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00

SECTION D - FORECASTED CASH NEEDS					
	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$ 245,000.00	\$ 60,000.00	\$ 70,000.00	\$ 50,000.00	\$ 65,000.00
14. Non-Federal	\$				
15. TOTAL (sum of lines 13 and 14)	\$ 245,000.00	\$ 60,000.00	\$ 70,000.00	\$ 50,000.00	\$ 65,000.00

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT				
(a) Grant Program	FUTURE FUNDING PERIODS (YEARS)			
	(b)First	(c) Second	(d) Third	(e) Fourth
16. Enhanced Air Quality Monitoring for Communities	\$ 110,000.00	\$ 94,988.00	\$	\$
17.				
18.				
19.				
20. TOTAL (sum of lines 16 - 19)	\$ 110,000.00	\$ 94,988.00	\$	\$

SECTION F - OTHER BUDGET INFORMATION	
21. Direct Charges: 409080	22. Indirect Charges: 40908
23. Remarks: 10% Di Minimis	

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COVERPAGE

Project Title: Tribal Community Air Quality Capacity Building and Monitoring Project

Applicant: Upper Mattaponi Indian Tribe

Address: 13476 King William Rd, King William, VA 23086

Primary Contact: Leigh Mitchell

Phone: (804)535-0561

Email: environment@umitribe.org

DUNS Number: 0811661900000

Set-Aside: Tribal Set-Aside

Brief Description of Applicant Organization: The Upper Mattaponi Indian Tribe is a recently federally recognized tribe. The Tribe and the is committed to serving its citizens, preserving its culture, and continuing stewardship of its homelands. The Environmental and Cultural Protection department's mission is to protect, conserve, and enhance Tribal natural resources for the benefit of the community.

Project Partners:

Virginia Department of
Environmental Quality
Contact: Charles Turner

Virginia Tech University
Contact: Dr. Elena Lind

George Mason University
Contact: Dr. Jeremy Campbell

Project Location: The Upper Mattaponi Tribal community and the greater York River watershed in Virginia.

Air Pollutant Scope: Ozone, PM2.5, Formaldehyde, PM10, Nitrogen Dioxide, and Sulfur Dioxide.

Budget Summary:

EPA Funding Requested	Total Project Cost
\$449,988	\$471,984

Project Period: September 30, 2022 - August 31, 2025

Short Project Description: The primary objectives of this project include building Tribal capacity to implement an air quality program by 1) training Tribal citizens in air quality knowledge and skills; 2) developing a community advisory board, 3) installation and maintenance of a Tribal Air Quality Monitoring Station, 4) assessment of Tribal community air quality and opportunities. This project leverages strategic partnerships, enabling the Tribe to gain the necessary training, tools, research, and support to bring data monitoring into the Tribe's decision making process, ultimately empowering them to better serve their community.

WORKPLAN

Section 1: Project Summary and Approach

A. Overall Project

The Upper Mattaponi Indian Tribe submits this application under the FY2022 Enhanced Air Quality Monitoring for Communities Grant opportunity. The Tribe is proposing a Community Scale Air Pollution Monitoring Project within its traditional lands, the York River watershed in the Commonwealth of Virginia. If successful, this application will enable the Tribe to build the capacity and knowledge to establish and maintain an air quality monitoring program. The project is intended to characterize the ambient concentrations of air pollutants, specifically aerosols (PM2.5 and PM10), Nitrogen Dioxide (NO2), Ozone

(O3), and formaldehyde (HCHO), hazardous air pollutants, as well as perform corresponding air quality assessments for the Upper Mattaponi Indian Tribal Community. Tribal citizens have long expressed concerns about air quality in the Tribe's homelands due to the siting of industrial facilities and encroaching development. *This capacity building project will fill a needed gap in air monitoring in the region while also enhancing the Tribal community's participation in the stewardship of the environment and its ability to address environmental and health disparities. The results of these objectives will inform Tribal decision-making and strategic planning to improve air quality and community health.*

The Upper Mattaponi Indian Tribe has reserved the right to continue to practice our ways of life within our homelands, which are now in parts of the York River watershed, specifically, King William, King and Queen, Hanover, Caroline, New Kent, Gloucester, James City, Mathews, York, Middlesex, and Essex counties in Virginia. UMIT citizens depend on the environment to meet spiritual, ceremonial, medicinal, subsistence, recreation, and economic needs. *A different force is now affecting our ability to hunt, fish, gather resources, steward the land and ultimately survive: pollution.* The Tribe is especially concerned about the possible impacts on human and environmental health caused by particulate matter (PM) from industrial sites, potentially elevated ozone and formaldehyde levels due to photochemical atmospheric processes.

The biggest challenge the Upper Mattaponi Tribal community faces when it comes to air quality is the *lack of data*. While there are over 40 regulated point source pollutant emission facilities and dozens of active mineral mines and timber sites all within the Tribal area (EJScreen 2.0, EnviroAtlas, and VA DMME), there is no air quality monitoring currently being done in the region. The closest facilities are the ozone-only monitoring stations maintained by the Virginia Department of Environmental Quality (DEQ) in Caroline and Hanover counties, over 25 miles from the Tribe's government center, and even further from the majority of UMIT citizens. There is a need to develop comprehensive air quality monitoring specifically within the York River watershed region. Compounding this issue, recent federal recognition means the Tribe also currently *lacks resources*—including knowledge, technical skill, and manpower—to contribute and participate in air quality monitoring and analysis. In order to address these needs, the Tribe proposes leveraging partnerships to build Tribal capacity in order to accomplish the following Primary Objectives:

- 1) Train 2 Tribal citizens in air quality knowledge and skills (air quality monitoring, instrumentation, equipment calibrations, station operations, regulations, emissions testing, pollution and health effects, data interpretation, and mitigation options) and the development of Tribal Environmental Advisory Board.
- 2) Collect data on air pollutants (PM2.5, Ozone, Formaldehyde, PM10, Nitrogen Dioxide, and Sulfur Dioxide) in the Tribal community with the implementation and maintenance of a suite of air quality monitoring equipment.
- 3) Evaluate the Tribal community's air quality by developing an air quality assessment and research to outline the continued monitoring and maintenance plan, SOPs, quality assurance measures, policy action plan, delegated programs roadmap, community health risk evaluation, partnerships, data gaps, and future funding opportunities.

Virginia Polytechnic Institute and State University (Virginia Tech), George Mason University (GMU), and the Virginia Department of Environmental Quality (DEQ) have committed to assisting the Tribe with all three of these project objectives. *Through these partnerships and this project, the Tribe will gain the necessary training, tools, research, and support to bring data monitoring into the Tribe's decision making process, ultimately enabling them to better serve their community.*

B. Regional Air Quality & Project Significance:

UMIT is located in the area potentially impacted by smog (high ozone concentrations and secondary aerosols, see **Fig. 1** center and right panel) in addition to direct emissions of particulate matter from local industry and transported from the Richmond metropolitan area (**Fig. 1** left panel). Formation of photochemical smog in the lower troposphere involves oxidation of volatile organic compounds (VOCs) in the presence of nitrogen oxides ($\text{NO}_x = \text{NO} + \text{NO}_2$) and sunlight. O_3 formation exhibits a non-linear dependence on highly variable precursors. Therefore, simultaneous measurements of O_3 , NO_x , and VOCs are required. Of the 187 hazardous air pollutants (HAPs) identified by the EPA, formaldehyde (HCHO) is a VOC and has the largest impact on human health, constituting roughly half of total HAP-related cancer risk (Strum and Scheffe, 2016). In the US, spatio-temporal patterns in HCHO concentrations and HCHO exposure are driven by oxidation of biogenic isoprene. We expect local HCHO enhancements due to emissions, transport and photochemistry on the Tribal lands.

Due to the known and suspected presence of air pollutants (e.g., $\text{PM}_{2.5}$) in the region, an assessment of the ambient air quality is needed to examine the possible health effects from these sources in this community. Additionally, health data suggests that the community has been disproportionately burdened by environmental risks. A significant portion of the Tribal community are below the federal poverty level. EPA's EJScreen identifies much of King William County in the 60-90th percentile for most EJ Index variables, including: 80-90th percentile for wastewater discharge, 70-80th percentile for Superfund proximity, 60-70th percentile for hazardous waste proximity, and 60-70th percentile for ozone. This assessment also ranks our region in the 90-95th percentile for low life expectancy, 70-80th percentile for asthma, and 80-90th percentile for 2017 air toxics cancer risks. Additionally, the 2017 National Air Toxics Assessment (NATA) indicates that Virginia's Middle Peninsula region has an average cancer risk of approximately 30 in a million due to Hazardous Air Pollutants (HAPs). **Figures 1** show the existing air quality monitoring in our region is exceedingly low. Currently, there is no O_3 , CO, NO_2 , SO_2 , $\text{PM}_{2.5}$, PM_{10} in or near the Tribal area (Middle Peninsula region). Furthermore, the center of Tribal community life—located along Virginia Route 30 in King William County—is surrounded by a number of large-scale industrial facilities, including a cat litter factory, a waste management facility, several sand and gravel mines, an open air clay mine, an airport, and timbering operations (Fig. 1 center panel).

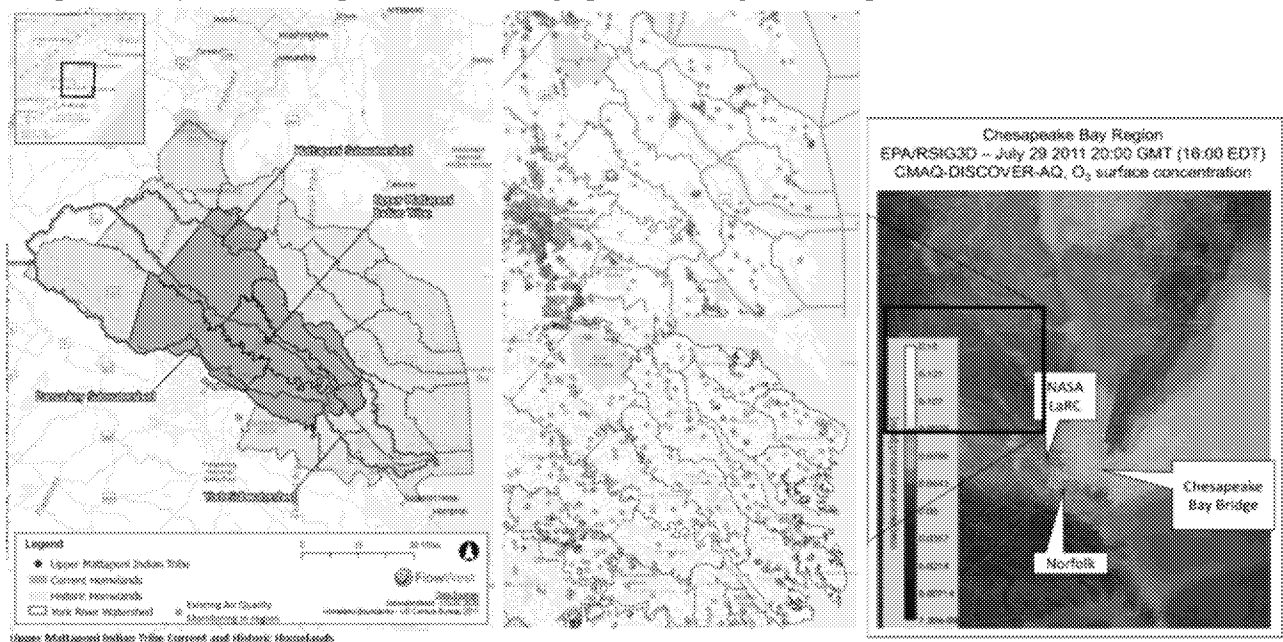


Figure 1: Left panel: The map on the left shows UMIT Tribal lands and existing air quality monitoring in the region. Center Top: The map shows regulated air pollution facilities (Enviro Atlas: ICIS-AIR, ICIS-AIR Major). Center Bottom: The figure on the bottom left shows active mineral

mining permits (VA DMME). Right panel: elevated CMAQ surface Ozone mixing ratio estimation during DISCOVER-AQ in and around the Tribal Homelands.

B. Project Significance

As indicated above and further elaborated in the Environmental Justice section of this proposal, the homelands of the Upper Mattaponi Indian Tribe potentially face air quality issues. The air quality assessment, and continued monitoring plan will provide important lessons and tools for the Tribe to contribute needed data and to improve air quality efforts across the watershed and provide a platform for the community to address these concerns. Not only will the Tribal community be supported but the wider community will benefit from the increased monitoring this project proposes. The Commonwealth of Virginia has significantly less air monitoring capacity than the surrounding states, and our partnership with the VA DEQ will work with the state to build out its network.

This proposed project aligns with the Tribe's EPA EPA-Tribal Environmental Plan (ETEP), which outlines the priority of establishing an Air Quality Program. This project would directly assist with goals of participating in air quality training, build air quality knowledge to participate in the regulatory process, and develop an air monitoring project. It also addresses a major community concern. The Tribe conducted a citizen census in 2021 which overwhelmingly identified air quality as a major environmental concern to the community, with over 70% of citizens saying air quality was a 'Very Important' environmental concern to them.

This project also aligns with and builds upon the Tribe's EPA Exchange Network grant that implements the technological systems necessary to efficiently acquire, manage, analyze and share environmental data through the establishment of a data management plan. The Tribe's intention is to use this funding opportunity to jump start an air program and work to secure additional funding to ensure the longevity of the program. Having trained staff to oversee the maintenance of the air monitoring will assure project sustainability. Part of this grant will also include a final report that will outline a roadmap of future funding sources the Tribe will pursue.

Section 2: Community Involvement

A. Community Partnership

The Upper Mattaponi Indian Tribe anticipates many opportunities for partnership during this project. This air quality monitoring and training project will leverage strategic partnerships so that the Tribe gains the necessary research training and support to bring data monitoring into the Tribe's decision making process. This partnership team is composed of interdisciplinary atmospheric physics and chemistry, cultural anthropology, and air monitoring experts who are committed to the study and wise management of air quality. UMIT will work directly with two universities, Virginia Tech and George Mason University, and a state agency, Virginia Department of Environmental Quality to assist the Tribe in the design and performance of the project, ultimately aiding in the Tribal community's capacity building. Moreover, this team represents the necessary partners to ensure data and regulatory cohesion of this project. This team is uniquely qualified to conduct the following tasks to advance the implementation of this project. They will provide a range of services, particularly technical assistance/expertise as indicated below:

Dr. Elena Lind, Assistant Professor of Electrical and Computer Engineering at **Virginia Tech**, has expertise in: (1) design, calibration, and deployment of UV-VIS spectroscopic ground-based remote sensing instruments for measuring trace gasses in the troposphere and stratosphere; (2) radiative transfer modeling of solar UV-VIS radiation propagation in the atmosphere; and (3) algorithm development for remote sensing data inversion (e.g., optimal estimation methods, analytical methods). She participated in multiple international and national field campaigns. She was part of the Pandora Project at NASA/Goddard Space

Flight Center and is currently PGN scientific advisor. Dr. Lind has extensive experience and expertise in data generation and distribution in standardized data formats. Dr. Lind will oversee calibration of the new Pandora instrument, coordinating instrument deployment, supervising a PhD student in Electrical Engineering on DOAS error evaluation and quality assurance. She will train the 2 Tribal citizens to maintain and interpret the NO₂, SO₂, HCHO and aerosol data from the air monitoring instrumentation.

Dr. Jeremy Campbell, Assistant Director for Strategic Engagement with the Institute for Sustainable Earth at **George Mason University**: Dr. Campbell is a cultural anthropologist who brings over two decades of community-based, participatory research and project management to this initiative. His research specialization is in cultural-based environmental knowledge in the Brazilian Amazon, and has also facilitated environmental education and tribal outreach programs in New England. In this project, Campbell will interface directly with tribal leadership to assist in designing and sustaining culturally-appropriate training materials for the Tribal trainees. He will also serve as a direct link to the human and technical resources at George Mason University, including data modeling and analysis capacities housed in the Department of Atmospheric Science. Campbell is also Co-PI on a parallel project, the *Indigenous Environmental Mapping and Resilience Planning in the Greater Chesapeake Project*, which is an intertribal partnership in which the Upper Mattaponi Indian Tribe is a lead collaborator.

Charles Turner, Manager, **Air Quality Monitoring at the Virginia Department of Environmental Quality**: The Office of Air Quality Monitoring is responsible for the installation, optimizing, operating, repairing, replacing and shutting down all air monitoring sites and site instrumentation for the Commonwealth of Virginia. Chuck Turner has managed the Virginia DEQ Office of Air Quality Monitoring for fifteen years. During this time, he has been responsible for the installation of multiple new monitoring sites including 2 Near Road sites, a National Air Toxics Trend site, 4 Lead (Pb) sites and a large multipollutant site in Hampton, VA. In this project, DEQ's Office of Air Quality Monitoring will assist the Tribe with selecting a suitable site for the monitoring effort and will assist in training the 2 Tribal citizens on the applicable Quality Assurance methods and techniques. This would be DEQ's first partnership with a federally recognized tribe which will help DEQ better understand the Tribal community.

The Upper Mattaponi Indian Tribe plans to maintain these relationships in the future by formalizing university and tribal research collaborations. The Upper Mattaponi hopes to develop a government-to-government relationship with the Virginia Department of Environmental Quality.

B. Community Engagement

In addition to the UMIT Government taking the lead in this project, the broader tribal community will participate significantly. Their involvement will include: hiring and training tribal citizens in air quality monitoring; community engagement activities to build understanding of air quality impacts on health; and the development of a Tribal Environmental Advisory Board. By conducting this project, UMIT, their partners and regional stakeholders will establish a working relationship with tribal citizens to address the community's concerns.

The Tribe will hire two tribal citizens that will gain technical training, develop and lead the local Tribal Environmental Advisory Board, develop community workshops and educational resources, assist with the research and reports. These tribal citizens will be trained in various air quality topics, specifically, air quality monitoring, instrumentation, equipment calibrations, regulations, emissions testing, pollution and health effects, data interpretation, and mitigation options by our project partners. With assistance from our partners with expertise in community-based research, we will also create a Tribal Environmental Advisory Board charged with supporting UMIT Government and incorporating community voice into this and related projects. The Board will meet quarterly and will be made up of at least 1 Tribal Council Member, 1 Tribal elder, 1 Tribal Citizen at large, 1 Tribal youth, the 2 Tribal citizen trainees and Environmental Director, thus

engaging many facets of the broader community. The Board will oversee how the Tribal community will participate in this project, receive environmental education and determine feedback systems. The Board will also facilitate data sharing with the community throughout the duration of this project. This will include updates in the Tribe's quarterly newsletter, hosting open forums and participatory trainings, and disseminating reports. Board members will receive a small stipend for their service and travel and will report meeting minutes to the Environmental Director.

UMIT has worked with many organizations and will continue to do so as the Tribe moves forward. The project partners will have recent involvement with the Tribal community. The Tribe has worked with VT on Tribal consultation and a tribal tourism assessment project. The UMIT Tribal community has also worked with VT on a hands-on geology project on Tribal lands. The Tribe and GMU successfully acquired a Summer Team Impact Grant to support the *Indigenous Environmental Mapping and Resilience Planning* project for the summer of 2022, which centers on tribal participation in citizen science initiatives.

Section 3: Environmental Justice and Underserved Communities

This project will promote environmental justice by meaningfully engaging the Tribal community through building capacity, restoring their environmental decision making power, and allowing the Tribe to have a seat at the table when projects may impact the community. The Upper Mattaponi Indian Tribe is a federally recognized Tribe based in King William County, Virginia. The Tribe was officially recognized by the commonwealth of Virginia in 1983 and received federal recognition in 2018.

Virginia tribes were some of the first tribes to experience contact with European settlers. When the British colonists arrived in 1607, the Upper Mattaponi were prosperous members of the Powhatan Chiefdom, residing in the ancestral lands of Tsenacommacah which encompassed the Tidewater and Eastern Shore regions of Virginia. By the mid-1600 there was a 90% population loss and tribes were forced to the upper reaches of the Mattaponi River. The Tribe were signatories to the Middle Plantation Treaty of 1677 as a tributary tribe, subject to the Queen of the Pamunkey, which led to more relocation and the establishment of a reservation of Chickahominy and Mattaponi Indians near Passapatan. During the 1700s, the Chickahominy moved back to their homeland. Those people who remained were ancestors of today's Upper Mattaponi. Virginia's Racial Integrity Act (1924) then moved to dissolve Indian identity by reclassifying Native Americans as "colored." Tribal citizens were unable to receive a high school diploma, marry outside their artificial race, or pursue economic development. That forced Native Americans in Virginia to move out of the commonwealth to more-receptive communities or to disguise their heritage.

The Upper Mattaponi, like all Virginia tribes, have faced incredible hardship, particularly from forced relocation, cultural assimilation and the paper genocide of Indian identity. These actions led to the delay of federal recognition and the current capacity needs of the Tribe. Given the near erasure of Native communities in Virginia, our communities continue to face threats to our traditional ways of life, culture, land, and ultimately, our survival. The centuries-long struggle of Native nations to maintain cultural identity and sovereignty has greatly contributed to the historical legacy of these communities. Nevertheless, Tribal communities, including the Upper Mattaponi Indian Tribe, have persisted, their knowledge and traditions living on through the generations.

The inland waterways of the York River watershed surround the Tribe's current Tribal center, with the Tribal Government operating in King William County (the Tribe owns 400 acres in the county). The Upper Mattaponi are water people, and the Chesapeake Bay, York River and its tributaries are our homelands and thus are essential to the Tribe's culture, livelihood and identity. Centuries of settlement, industrialization, mining, and manufacturing have not only shaped the physical landscape, but have also

impacted the minds and bodies of tribal citizens. Many of our citizens report health issues tied to environmental hazards which have only worsened with the COVID-19 pandemic.

The tribal government center is directly adjacent to a 40-acre cat litter factory site and 486-acre clay mine site. As of 2020, there were over 80 active mineral mining facilities in the Middle Peninsula region as well as extensive timber harvesting. The Tribal community is also being impacted by rapid and intense residential development associated with suburban sprawl from Richmond. These factors have combined to increase traffic, contributing to elevated levels of particulate matter and ozone in our area. As with other environmental justice communities throughout the state and nation, the Upper Mattaponi Indian Tribe has been relatively unable to participate in zoning decisions around the siting of industrial facilities, road or residential development projects, or other land- and water-use decisions that directly impact our people.

Section 4: Environmental Results—Outcomes, Outputs and Performance Measures

The goals and results of this project support EPA's Draft Fiscal Year (FY) 2022-2026 Strategic Plan *Goal 4: Ensure Clean and Healthy Air for All Communities, Objective 4.1 Improve Air Quality and Reduce Localized Pollution and Health Impacts* by directly increasing the capacity and implementing the necessary tools for the Tribe to participate in meaningful engagement for improved environmental outcomes. The outputs and outcomes of this project will facilitate and empower the Tribal community to improve air quality and reduce pollution. This project also supports the following EPA Strategic Plan goals and objectives: *Goal 2: Take Decisive Action to Advance Environmental Justice and Civil Rights, Objective 2.1: Promote Environmental Justice and Civil Rights at the Federal, Tribal, State, and Local Levels* by giving the Tribe the necessary tools to protect the community's health and environment.

The project's outputs, outcomes, performance measures and schedule are provided in Tables 1 and 2 below. More detailed descriptions of the outputs, their corresponding outcomes, performance measures and plans, and timeframe are described below.

A. Expected Project Outputs and Outcomes

Output 1: Air Quality Training of Tribal Citizens

During the implementation of this project, UMIT plans to collaborate with several organizations, including federal and state agencies, academia and community groups in order to receive the necessary knowledge and skills training to run an air quality program. Virginia Tech, GMU, and DEQ have committed to training 2 Tribal citizens in air quality monitoring, instrumentation, equipment calibrations, regulations and permitting, emissions testing, pollution and health effects, data interpretation, and mitigation options. The Tribal citizens will also pursue EPA air quality training as well as other relevant conferences, training, and certifications. **Outcome:** This output is essential to help build Tribal capacity to manage air quality concerns and future mitigation efforts by directly providing employment, knowledge and skills. This outcome will increase access to information and tools that increase understanding and reduction of environmental and human health risks. **Performance Measure & Timeline:** This output will be completed over 30 months and include tracking training hours, certifications, and a skills assessment.

Output 2: Creation of Tribal Environmental Advisory Board

The Tribe will create an advisory board to ensure community involvement of the project and assist with the outreach. The Board will be composed of 1 Tribal council member, 1 Tribal elder, 1 Tribal citizen at large, 1 Tribal youth, the 2 tribal citizen trainees and the Project Manager. The Board will oversee the Tribal community's participation in the project, receive environmental education, facilitate data sharing with the community, and host open forums. Environmental education on topics such as what air pollution is, how it is regulated and measured, and what a health risk assessment means will be run by the Tribal citizen. **Outcome:** This output is essential to not only ensure community participation throughout the project, but also build community awareness and education around air quality. There will also be increased access to information that increases understanding and reduction

of environmental and human health risks. **Performance Measure & Timeline:** This output will be completed within the first six months of the project but will continue over 30 months, which will include quarterly meetings of a diverse citizen group facilitated by the project manager and tribal citizen trainees. Minutes will be taken at each meeting to document participation, input and activities.

Output 3: Deployment of Air Quality Monitoring Equipment on Tribal Land (O3, PM2.5, HCHO, NO2, SO2, and PM10).

The Tribe will plan, purchase, and site air quality monitoring equipment on Tribal land in King William County. This output will deploy equipment to conduct Ozone, PM2.5, HCHO, NO2, SO2, and PM10 data in the Tribal community. The siting plan, deployment of monitoring equipment and calibration will be done in collaboration with VT and DEQ. The Tribe will also hire a contractor to prepare the site and build the necessary shelter for the equipment. The Tribe will install a Pandora Spectrometer System to measure the near surface concentrations and tropospheric columns of NO₂, SO₂, and HCHO, as well as a We propose to deploy a Teledyne Model 640x Real-Time Continuous PM Monitor and ozone monitor to measure PM2.5 and PM10, and O3. VT and DEQ will also provide calibration, maintenance, and operational training to UMIT trainees. **Outcome:** This output will directly supply the necessary equipment to address the Tribal community's air quality concerns, enabling the Tribe to access to tools that increase understanding and reduction of environmental and human health risks. **Performance Measure & Timeline:** This output will be completed over the first year of this project and will include tracking and reporting progress on expenditures and purchases.

Output 4: Near Real-Time Air Quality Data Availability/Database for the Tribal Community and other Local Stakeholders.

The collection of raw data from the equipment will be facilitated by UMIT with the assistance of VT, DEQ, and a QA Contractor. UMIT will work with a QA Contractor to ensure quality assurance and quality controls, develop SOPs and make sure the data aligns with the Tribe's Data Management Plan requirements. The monitoring equipment will be operated in accordance with all EPA quality control and quality assurance requirements. The Tribe will review DEQ's Quality Assurance Project Plans (QAPPs) and Standard Operating Procedures (SOPs) designed and approved for current programs as guidance. Data will be available to the Tribe and project partners. The Pandora system uses spectroscopy to study ultraviolet (UV) and visible wavelengths of light to determine the composition of the atmosphere and its interactions with Earth's environment. This remote sensing approach allows for total column and profile measurements.

Outcome: This output will result in a database of comprehensive air pollutant data useful for not only the Tribal community, but regional stakeholders, state agencies and future EPA modeling efforts. This would increase the Tribe's access to information that increases understanding and reduction of environmental and human health risks. This output would fill multiple gaps in monitoring data. The in-situ aerosol measurements will be uploaded to the state's database which will support Virginia's Annual Ambient Air Monitoring Report. **Performance Measure & Timeline:** This output will be completed over 27 months and include overseeing a QA consultant and working with the team to complete QA results from the sampler operations and data capture.

Output 5: Tribal Community Assessment of Air Pollution Data

The analysis of Tribal air quality will be conducted in partnership with VT and GMU, which have extensive expertise in environmental analysis. The data will be analyzed by UMIT with the support from VT and GMU student researchers to develop a Tribal community assessment of air pollution data and any other relevant research. The air quality assessment will be guided by the input from the Tribal Board. This assessment will be shared with the Tribal community and be used to inform Output 6. The Tribal Board will also work to outline specific research questions for continued collaborative research. **Outcome:** This output will enable the Tribe to develop analysis and research skills, and begin to identify air quality problems in the community. **Performance Measure & Timeline:** This output will be completed over 18 months and will include at least quarterly meetings with project partners, Tribal citizen trainees, the Tribal Board, and Project Manager.

Output 6: Final Project Report

UMIT will develop a comprehensive final project report that includes an abbreviated Tribal air quality assessment, and outlines the continued monitoring and maintenance plan, SOPs, quality assurance measures, policy action plan, delegated programs roadmap, community health risk evaluation, partnerships, data gaps, and future funding opportunities. The partners will supplement any resources the Tribe may need to complete this report. This report will help guide the Tribal community to protect the environment and citizens and outline the sustainability of the program. **Outcome:** This output will result in Tribal policy action(s) to mitigate certain air pollutants. This report will be used to inform future air quality opportunities. is the first build the foundation to which the Tribe can build future reduction of a **Performance Measure & Timeline:** This report will be compiled over the final year of the project with quarterly progress reports.

Table 1: These outputs and outcomes combined make up the foundational elements for the Tribal to facilitate the reduction in ambient emissions, concentrations, and human exposure of air pollutants in the community.

Outputs	Outcomes	Performance Measures
Output 1: Air quality training of Tribal citizens	Increased access to information and tools that increase understanding and reduction of environmental and human health risks.	Skills assessment, training hours and certifications completed.
Output 2: Creation of Tribal Environmental Advisory Board	Increased community awareness.	Installation of a diverse 7-member Board by Summer 2023, with quarterly reports including minutes, participation, and areas addressed.
Output 3: Deployment of air quality monitoring equipment on Tribal land (Ozone, PM2.5, HCHO, NO2, SO2, and PM10).	Increased access to tools that increase understanding and reduction of environmental and human health risks.	Tracking and reporting progress on expenditures and purchases.
Output 4: Near real-time air quality data availability/database for the Tribal and other local stakeholders.	Increased access to information that increases understanding and reduction of environmental and human health risks.	Meet data capture requirements for all pollutants. Meet all required QA requirements and manufacturer's recommended work practices
Output 5: Tribal community assessment of air pollution data	Problem identification.	Minimally, quarterly meetings with partners, Board and Project Manager throughout the project.
Output 6: Final project report	Tribal policy action(s) to mitigate certain air pollutants.	100% of progress reports completed on time.

B. Performance Measures and Plan

The Tribe has an internal mechanism to track, measure, and report progress toward achieving the expected outputs and outcomes. The Project Manager (PM) will be responsible for ensuring the progress and completion of all outputs, evaluating the results. Additionally, the PM will complete and submit the quarterly and final reporting requirements per the grant guideline. Descriptions on how the results of the project will be evaluated are listed above (Table 1) and also summarized under each output in the previous section. All data collected during the project will follow EPA procedures when applicable.

C. Timeline and Milestones

The Table below outlines the timeline and milestones of this project. The PM, Tribal trainees and partners will work collaboratively to complete these tasks over the proposed timeline. Tasks are organized by output. Table 2 and Milestones.

Output Addressed	Task	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Hire 2 Tribal citizens												
1, 5, & 6	Air quality training and management												
2	Create Tribal Environmental Advisory Board												
2	Tribal Environmental Advisory Board meetings												
3	Research & select air monitoring equipment												
3	Purchase air monitoring equipment												
3	Hire installation Contractor												
2	Site air monitoring equipment												
4	Hire QA Consultant												
4	Develop QAPP, SOPs, & data alignment												
1 & 4	Collect air quality data												
4	Data validation and summary												
1 & 5	Tribal community air assessments and research												
1 & 6	Final project report												
all	Prepare and submit grant reports												

Section 5: Quality Assurance Statement

See attached Quality Assurance Statement.

Section 6: Programmatic Capability and Past Performance

A. Past Performance & Reporting Requirements

As a recently federally recognized tribe, federally funded assistance agreements UMIT currently have are still active. UMIT has successfully received and managed grants from the CDC, HUD, BIA and EPA. While these grants are currently ongoing, the Tribe continuously meets reporting requirements but has yet to submit final technical reports given their status. The Tribe has policies and procedures in place to ensure the successful reporting and financial management of grants. The Tribe completed its first external audit for FY 2020 and received an unqualified opinion on the financial statements from PBMares. Moreover, it found that based upon past experience, no provision has been made in the accompanying financial statements for the refund of grant monies.

The Tribal successfully received the EPA Exchange Network grant to develop a data management plan to outline a virtual exchange service for environment data. If this project is successful, air quality data collected as part of this project will be compiled, processed, and uploaded to the US EPA air quality database.

B. Staff Expertise

Project Manager: Leigh Mitchell, Environmental & Cultural Protection Manager. She was selected for the role based on her academic background, experience working collaboratively with tribes and non-tribal entities, and ability to manage environmental projects. Leigh's project roles and responsibilities will include:

- Ensuring timely completion of project deliverables
- Leading overall Tribal coordination
- Hiring & Managing Tribal citizen trainees
- Procuring contractors
- Performing quarterly and final reports

Tribal Citizen Trainees: UMIT will use a portion of this grant to hire key personnel. The successful candidates will have bachelor's degree in the field(s) of: environmental science, geography, chemistry, ecology, engineering or related field. They will have 2+ years of experience with environmental data collection and management. VT, GMU, and DEQ and other stakeholders have committed to providing training and field experience to 2 tribal citizens in a plethora of air quality activities over the course of 30 months. The role that is being hired for is 1 full environmental technician and 1-part time environmental technician. They will be responsible for:

- Leading Tribal outreach
- Coordinating with Partners
- Output 2: Creation of Tribal Environmental Advisory Board

Output 3: Deployment of Air quality monitoring equipment on Tribal land
Output 4: Near real-time air quality data availability/database for the Tribal community and other local stakeholders.

Output 5: Tribal community assessment of air pollution data
Output 6: Final project report

Partners & Consultants: The project manager will work with the 3 project partners and 2 consultants to complete the various outputs. Specifically, Dr. Elena Lind will assist with Outputs 1, 3, 4 and 5; Dr. Jeremy Campbell will assist with Outputs 1, 2 and 5; and Mr. Charles Turner will assist with Outputs 1, 3, 4 and 5. The consultant is responsible for all QA and Output 4. *Please see the attached Appendix for Project Team Biography.*

Section 7: Budget

A. Budget Detail & Reasonableness of Costs

The total budget for this project is \$449,988 in direct grant funding. The budget includes a total of \$409,080 in direct costs, comprising of \$146,016 for personnel, \$37,964 for fringe, \$114,000 for equipment, \$27,000 for supplies, \$17,200 for travel, \$31,900 for other, and 35,000 for contacts. The Tribe's indirect costs for this project are \$40,908. There are \$22,152 of in-kind funds provided by partners. The following are details including reasonableness of costs of the funding request for the proposed project:

Personnel

Budget estimate Tribal of staff in the following classifications: (1) Environmental & Cultural Protection Director; (2) Tribal Trainees (Environmental Tech and Air Tech). The Environmental Director is the Project Manager and will oversee the completion of the Training and ensure timely completion of project deliverables. The Tribal Air Tech Trainee will assist on all aspects of this project in a full time capacity. The Tribal Environmental Tech Trainee will also assist in all objectives of this project but in a part time capacity. As the Tribe is in a capacity building stage, hiring key personnel will be essential to this success of the project.

In Kind: Virginia Tech, George Mason University and Virginia Department of Environmental Quality staff have generously agreed to provide Tribal trainees with 30 months of air quality training. This will require an average of 0.025 FTW to complete. Valuation provided by partners.

Fringe Benefits;

Fringe components consist of: worker's compensation (6%), FICA (7.65%), SUTA (2.51%), and payroll taxes (9.84%).

Equipment

Equipment includes a suite of equipment that will provide the Tribe with the necessary equipment to comply with EPA standards but also address the community's pollutant concerns. The Pandora Spectrometer System was designed to specifically look at levels of ozone, nitrogen dioxide and formaldehyde in the atmosphere. What makes the Pandora unique from other ground-based networks at NASA is that it can measure total column profiles, observing different layers of the atmosphere at once. The T640X PM10/PM2.5 continuous sampler, PM10Sampler, and Ozone analyzer will address the PM2.5, PM10, and Ozone aspects of the air quality monitoring objectives. The 8871 Data logger is necessary for DEQ's Data Acquisition System, so the Tribe is able to upload data to DEQ's web page.

Supplies

Budget estimates include the needed supplies to supplement the air quality equipment such as cabling, router, weather station, flow check verification hardware, and backup timer; general office supplies for the tribal trainees to complete the various objectives, such as desk, chairs, laptops and software, etc.; and the necessary air quality maintenance supplies to ensure the continuation of air monitoring such as filters, calibration supplies, and full sky

camera, and portable sensor. The weather station and full sky camera will help spark interest in the project and help ensure the safety of the equipment.

Travel

Tribal Trainee's will attend meetings, conferences and training related to air quality management. Travel costs were estimated to include transportation, lodging, and meals and incidental expenses based on the per diem following the Federal U.S. General Services Administration guidelines. The 2 tribal trainees will attend the EPA Air Pollution Training Institute and visit the Eastern Band of Cherokee Air Quality Management department to learn about their program. The 2 tribal trainees will also attend the annual National Tribal Forum on Air Quality and National Ambient Air Monitoring Conference. Finally, travel will cover the mileage for the siting and installation and maintenance and repair of the air quality equipment over the course of this project.

Contractual

As a recently federally recognized tribe, the Tribe has limited capacity and looks to consultants to fill gaps. UMIT will hire one consultant to complete the QA tasks and provide technical QA training. Outputs to be completed by the contractor include Output 4: Near real-time air quality data availability/database for the Tribal and other local stakeholders and some of Output 1: Air quality training of tribal citizens. The contractor will provide quality assurance on the air quality monitoring data and ensure quality control practices are applied during this project. The contractor will also train UMIT staff on maintaining QA on the data to ensure the longevity of the project after completion of this funding. The contractor will complete necessary QAPP and help develop SOPs. UMIT will also hire an Equipment Installation contractor to assist in the ground preparation and construction of the air quality monitoring equipment on Tribal land. The data logger, T640Xr and ozone monitoring equipment will have to be installed in a shelter.

Other

To ensure community input in this project, the Tribe will develop a Tribal Environmental Advisory Board that will include a stipend of \$85 per meeting x 10 meetings (quarterly meetings over 30 months) x 4 citizens. This Tribal Environmental Advisory Board will be made up of a diverse group of citizens who will receive a stipend for time and travel as well as the Tribal Trainee's and Environmental Director. This Board will ensure community involvement is woven in throughout all aspects of this project.

The Tribe will also conduct Tribal community engagement activities that need funds to cover meeting space and publication and distribution of materials. University student research stipends will be disbursed to Virginia Tech and George Mason students to assist the Tribe in completing Output 3: Deployment of Air quality monitoring equipment on Tribal land; Output 4: Near real-time air quality data availability/database for the Tribal and other local stakeholders; and Output 5: Tribal community assessment of air pollution data. The Tribe will coordinate with each university's corresponding project partner to assign a student researcher to support the Tribe with these objectives. This collaborative research support will be provided over 15 months. It is part of the Tribe's goal to build community partnerships and support youth education.

The monitoring equipment will require electric operating costs.

Indirect Cost

Indirect Cost Rate - The Upper Mattaponi Indian Tribe accepts a 10% de minimus rate as the Indirect Cost Rate since the Tribe has not negotiated an indirect cost rate and does not have one in negotiation at this time.

Table 3: Proposed Budget

Application for Federal Assistance SF-424

* 1. Type of Submission:

- ☐ Preapplication
☒ Application
☐ Changed/Corrected Application

* 2. Type of Application:

- ☒ New
☐ Continuation
☐ Revision

* If Revision, select appropriate letter(s):

* Other (Specify):

* 3. Date Received:

03/25/2022

4. Applicant Identifier:

5a. Federal Entity Identifier:

5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:

7. State Application Identifier:

VA

8. APPLICANT INFORMATION:

* a. Legal Name:

Upper Mattaponi Indian Tribe

* b. Employer/Taxpayer Identification Number (EIN/TIN):

82-5076379

* c. Organizational DUNS:

0811661900000

d. Address:

* Street1:

13476 King William Rd

Street2:

* City:

King William

County/Parish:

* State:

VA: Virginia

Province:

* Country:

USA: UNITED STATES

* Zip / Postal Code:

23086-3401

e. Organizational Unit:

Department Name:

Natural Resources Dept

Division Name:

f. Name and contact information of person to be contacted on matters involving this application:

Prefix:

Ms.

* First Name:

Leigh

Middle Name:

* Last Name:

Mitchell

Suffix:

Title: Environmental & Cultural Protection Director

Organizational Affiliation:

Upper Mattaponi Indian Tribe

* Telephone Number:

8045350561

Fax Number:

* Email: environment@umitribe.org

Application for Federal Assistance SF-424

* 9. Type of Applicant 1: Select Applicant Type:

I: Indian/Native American Tribal Government (Federally Recognized)

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

* 10. Name of Federal Agency:

Environmental Protection Agency

11. Catalog of Federal Domestic Assistance Number:

66.034

CFDA Title:

Surveys, Studies, Research, Investigations, Demonstrations, and Special Purpose Activities
Relating to the Clean Air Act

* 12. Funding Opportunity Number:

EPA-OAR-OAQPS-22-01

* Title:

Enhanced Air Quality Monitoring for Communities

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

1234-Areas Affected by the Project.pdf

Add Attachment

Delete Attachment

View Attachment

* 15. Descriptive Title of Applicant's Project:

Tribal Community Air Quality Capacity Building and Monitoring Project

Attach supporting documents as specified in agency instructions.

Add Attachments

Delete Attachments

View Attachments

Application for Federal Assistance SF-424**16. Congressional Districts Of:*** a. Applicant * b. Program/Project

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment

Delete Attachment

View Attachment

17. Proposed Project:* a. Start Date: * b. End Date: **18. Estimated Funding (\$):**

* a. Federal	<input type="text" value="449,988.00"/>
* b. Applicant	<input type="text" value="0.00"/>
* c. State	<input type="text" value="0.00"/>
* d. Local	<input type="text" value="0.00"/>
* e. Other	<input type="text" value="0.00"/>
* f. Program Income	<input type="text" value="0.00"/>
* g. TOTAL	<input type="text" value="449,988.00"/>

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

- ☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .
- ☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.
- ☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment

Delete Attachment

View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: * First Name:

Middle Name:

* Last Name:

Suffix:

* Title: * Telephone Number: Fax Number: * Email: * Signature of Authorized Representative: * Date Signed:



Institute for a Sustainable Earth

4400 University Dr., Fairfax, Virginia 22030
Phone: 703-993-5381

Environmental Protection Agency
Office of Air and Radiation
1200 Pennsylvania Avenue NW
Washington, DC 20004

March 24, 2022

Dear Grant Review Committee:

It is with great pleasure that I write to express our support for the funding request submitted by the **Upper Mattaponi Indian Tribe** for a tribal set-aside under the EPA's **Enhanced Air Quality for Communities** program (EPA-OAR-OAQPS-22-01). The Institute for a Sustainable Earth at George Mason University strives to connect researchers and specialists in sustainability-related fields to community partners locally, nationally, and globally. Through these partnerships, we work to address pressing challenges—such as resilience planning and environmental inequities—through impactful, ethical, and responsive research. Over 500 faculty members from across the University are affiliated with the Institute, and we work with numerous external partners on a range of research-to-action initiatives.

Over the past year, members of the ISE team have collaborated with the Upper Mattaponi Indian Tribe to strengthen the capacity of the Tribe's Office of Environmental and Cultural Protection. These collaborations have resulted in student internships and engaged research opportunities, overseen by Dr. Jeremy Campbell (ISE) and Dr. Tom Wood (Integrative Studies). The Tribe's funding request to develop an air monitoring program grows out of these efforts, as well as networking the Tribe has pursued with faculty at Virginia Tech and the scientific staff at the Virginia Department of Environmental Quality. I am pleased to note that Mason faculty with expertise in air quality are also involved in the planning and execution of this promising project, including Dr. Jenna Krall (a biostatistician with an interest in air quality and epidemiology), Dr. Lucas Henneman (an environmental engineer focused on air quality monitoring and regulations), and Dr. Daniel Tong (an atmospheric chemist with data modeling expertise). We are also excited to explore the possibility for graduate student research and class-based engagement with this project on the part of Mason undergraduates in the sciences. Additional forms of support that Mason brings to this work include training and capacity-building for Tribal staff, communication and outreach support, and networking with other research and community-based organizations in Virginia.

It is an honor for George Mason University to be partnering with the Upper Mattaponi Indian Tribe as they take the initiative to monitor and restore the health of their environment. The Institute for a Sustainable Earth fully supports this application for support from the EPA.

Sincerely,

A handwritten signature in black ink, reading "Leah Nichols".

Dr. Leah Nichols

Executive Director, Institute for a Sustainable Earth



**Bradley Department of Electrical and Computer
Engineering Department**

1185 Perry Street, Whittemore, Suite 302
Blacksburg, Virginia 24061
P: (540) 231-7494 F: (540) 231-3362

25 March 2022

Letter of commitment

Dear Leigh Mitchell,
Environmental and Cultural Protection Director
Upper Mattaponi Indian Tribe
environment@umitribe.org
804.535.0561
13476 King William Road, King William, Virginia 23086

I am writing this letter to

how project partners and supporting organizations will participate in or directly assist in
the design and performance of the project,

including their specific role, or

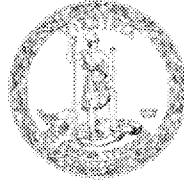
how obtaining support from project partners will allow the applicant to more effectively
perform the project.

Letters should be addressed to the applicant organization

Best Regards

Elena S Lind

Elena Lind, PhD
Assistant Professor
345 Durham Hall
Center for Space Science And Engineering Research
Electrical and Computer Engineering
Virginia Tech
Blacksburg, VA 24060
eslind@vt.edu



Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Office of Air Quality Monitoring
4949 Cox Road Suite C
Glen Allen, Virginia 23060
www.deq.virginia.gov

Travis A. Voyles
Acting Secretary of Natural and Historic Resources

Michael S. Rolband, PE, PWD, PWS Emeritus
Director
(804) 698-4020

March 25, 2022

Upper Mattaponi Indian Tribe
13476 King William Road
King William, Virginia 23086

Dear Ms. Mitchell,

As Manager of the Department of Environmental Quality Office of Air Quality (AQM) I would like to take this opportunity to express support for the proposed "Tribal Air Quality Capacity Building and Monitoring Project". The possibility of additional air quality data collected in the Commonwealth is welcome. The Tribal Lands for which you propose to install a monitoring site represents an area of the Commonwealth where there are relatively few air monitoring sites in our existing network. Additional air quality information will add to the robustness of the Commonwealth's air quality data.

The collection of air monitoring data requires that those operating the equipment understand the quality assurance requirements that ensure the data is representative of the area being monitored. AQM will work with the Upper Mattaponi Tribe to place the monitoring site so that it is located such that the information collected is representative of the monitored area. In addition AQM provides training for the operation and maintenance of the equipment Virginia has deployed in our network. I see it as being in our mutual interest to be sure the UMIT monitoring operators are trained in the operation and maintenance of the air monitoring equipment employed at the proposed site.

I would like to reiterate AQM's support for this project and that we look forward to working with the Upper Mattaponi Tribe in the location and training aspects of this project. Good luck with your Grant Application submittal.

Sincerely,

Charles L. Turner

Digitally signed by Charles L. Turner
DN: CN = Charles L. Turner email = charles.
turner@deq.virginia.gov C = US O = DEQ OU = AQM
Date: 2022.03.25 10:11:15 -0500

Charles L. Turner
Manager, Air Quality Monitoring

Appendix

A. Project Team Biography

Dr. Elena Lind: Dr. Lind has expertise in: (1) design, calibration, and deployment of UV-VIS spectroscopic ground-based remote sensing instruments for measuring trace gasses in the troposphere and stratosphere; (2) radiative transfer modeling of solar UV-VIS radiation propagation in the atmosphere; and (3) algorithm development for remote sensing data inversion (e.g., optimal estimation methods, analytical methods). She participated in multiple international and national field campaigns. She was part of the Pandora Project at NASA/Goddard Space Flight Center and has conducted support for long-term deployment of instrumentation. She is currently a PGN scientific advisor. Dr. Lind has extensive experience and expertise in data generation and distribution in standardized data formats and working with diverse groups including Tribal organizations.

Dr. Jeremy Campbell: Campbell is a cultural anthropologist with over 20 years of research and advocacy experience in partnership with Indigenous communities throughout the Americas. In this specific project, he brings expertise in translational research that integrates Traditional Ecological Knowledge (TEK) with Western scientific approaches to data and analysis, as well as robust experience in participatory action research methodologies. In this vein, Campbell will liaise with the Environmental Director and Tribal Leadership to advise in the creation of the Tribal Environmental Advisory Board, its duties, structures, and best resources for it to achieve its work (Output #2). He will also assist in the training of Tribal Citizens in the scientific communication of data/analysis to a broader Tribal public, including assistance in producing educational materials (Output #1). Finally, Campbell serves as a point of contact with the research community at George Mason University in his capacity as Assistant Director of the Institute for a Sustainable Earth. Mason faculty with expertise in air quality are also involved in the planning and execution of this project include Dr. Jenna Krall (a biostatistician with an interest in air quality and epidemiology), Dr. Lucas Henneman (an environmental engineer focused on air quality monitoring and regulations), and Dr. Daniel Tong (an atmospheric chemist with data modeling expertise). These partners, along with Mason graduate students and undergraduates, will assist in Output #5, Tribal community assessment of air pollution data.

Charles Turner: Chuck Turner has managed the Virginia DEQ Office of Air Quality Monitoring for fifteen years. During this time, he has been responsible for the installation of multiple new monitoring sites including 2 Near Road sites, a National Air Toxics Trend site, 4 Lead (Pb) sites and a large multipollutant site in Hampton, VA. In this project, DEQ's Office of Air Quality Monitoring will assist the Tribe with selecting a suitable site for the monitoring effort and will assist in training the 2 Tribal citizens on the applicable Quality Assurance methods and techniques. This would be DEQ's first partnership with a federally recognized tribe which will help DEQ better understand the Tribal community.

Quality Assurance Statement

The Tribe will hire a Quality Assurance Consultant to provide quality assurance and quality control practices during this project. To do this, UMIT will procure a quality assurance contractor for this project. The contractor will also complete the QAPP for this project. The contractor will be qualified to carry out the assigned work because they will have extensive and demonstrated experience in applied research, environmental monitoring data, quality assurance and quality control. The consultant will have unique expertise in the development, customization, and implementation of analytical tools for natural resource management. The consultant will also train UMIT on how to continue QA of the data so the Tribe can internalize this in the future. Contractor services will be procured through the Tribe's competitive Request for Proposal (RFP) process. The QA consultant will also coordinate with the Tribe to ensure data complies with the Quality Management Plan.

In addition to the QA consultant, Elena Spinei Lind will be responsible for remote sensing data assurance through the initial calibration of the instrumentation and evaluation of data quality within the Pandonia Global Network data quality assurance framework. DEQ will train the 2 tribal citizen trainees and provide QAPP and SOPs that UMIT can use to tailor to their program.

Air quality monitoring: NO₂, SO₂, HCHO (remote sensing), O₃, PM_{2.5}, PM₁₀ (in situ)

Remote sensing measurements of trace gasses: NO₂, SO₂ and HCHO.

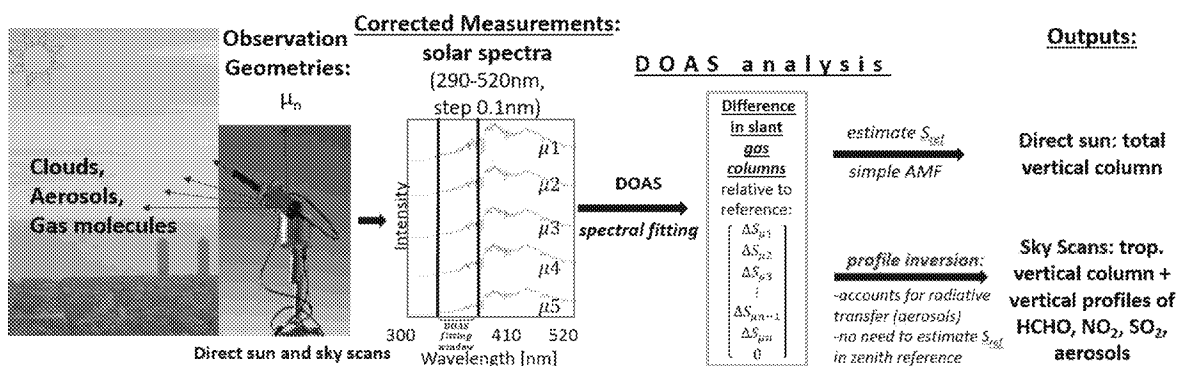


Figure 1. MAX-DOAS remote sensing technique measures near surface concentrations of 3 criteria pollutants (O₃, NO₂ and SO₂) and a hazardous air pollutant (HCHO) in addition to total and tropospheric columns above.

We propose to deploy a Pandora spectroscopic instrument (SciGlob, Inc) to measure near surface concentrations and tropospheric columns of NO₂, SO₂, and HCHO. This is the same instrumentation deployed within the NASA/ESA sponsored Pandonia Global Network (PGN). Pandora system is a robust, cost-effective, portable, fully automated and fully programmable to perform all types of continuous DOAS observations (e.g., direct sun, multi-axis, and target) from sunrise to sunset and overnight for moon measurements. Detected solar photons typically travel long enough paths to measure background ambient near surface concentrations of NO₂, HCHO and SO₂ above detection limit. Pandoras have no consumables and are designed for unattended operation in outdoor environments. Pandoras undergo extensive laboratory characterization and PGN has established quality assurance protocols. By operating on the principle of differential technique where the reference is a solar spectrum, Pandoras have no need for routine laboratory re-calibration. Pandoras are operated using a robust data acquisition and analysis software package, Blick Software Suite. Participating in PGN instruments benefit from NASA remote

instrument monitoring and operational support. Measured spectra are automatically collected and submitted to the PGN server via an Internet connection for centralized uniform real-time processing by the Blick Software Suite. Near-real time data dissemination and visualization (15 min delay) is available through <http://pandonia-global-network.org/> website. Pandora trace gas sky scanning (MAX-DOAS) and direct sun measurements have high precision (better than 5%) and contain gas information from local to global scales. Accuracy, however, is harder to characterize due to spatially averaged measurements. Pandoras measure scattered sky solar radiance within 1.5° field of view.

Remote sensing DOAS and in situ gas data include:

- Total columns of NO₂, O₃, SO₂, HCHO from direct sun irradiance measurements;
- Vertical profile information from surface to 2-4 km (vertical resolution depends on aerosols) from multi-axis sky scans (9-12 angles, ~ 10 min): NO₂, SO₂, HCHO, H₂O and aerosol optical depth.
- Tropospheric columns from multi-axis short scans (2-3 angles, ~ 2 min): NO₂, SO₂, HCHO
- Near surface concentrations from multi-axis short scans (5 angles, ~ 5 min): NO₂, SO₂, HCHO, O₃.
- In situ surface O₃ concentrations

In-situ measurements of O₃, PM2.5 and PM10

We propose to deploy a Teledyne Model 640x Real-Time Continuous PM Monitor to measure PM2.5 and PM10. The proposed instrumentation operates according to the approved Federal Equivalent Method (FEM) for PM2.5 [EQPM-0516-238], PM10 [EQPM-0516-239], and PM10-2.5 [EQPM-0516-240]. “The Model T640x PM Mass Monitor is an optical aerosol spectrometer that converts optical measurements to mass measurements by determining sampled particle size via scattered light at the single particle level according to Lorenz-Mie Theory.” Typical air sampling flow rate of 16.7 lpm.

We propose to deploy the 2B technologies Model 205 continuous Dual Beam Ozone Monitor, which operates on the principle of UV Absorption at 254 nm and is approved as FEM (EQOA-0410-190). In-situ aerosol measurements include: PM10, PM2.5, and PM10-2.5 mass concentrations will be measured by averaging 1-hr data with the precision of $\pm 0.5 \text{ ug/m}^3$ and lower detectable limit of $< 0.1 \text{ ug/m}^3$.

Leigh R. Mitchell

lrmitch@umich.edu ♦ 216.212.4402 ♦ www.linkedin.com/in/leighrmitchell

EDUCATION

University of Michigan (Ann Arbor, MI)

School for Environment and Sustainability, 2018 - 2020

M.S. Sustainable Systems ♦ Environmental Planning and Policy

University of Redlands (Redlands, CA)

Johnston Center for Integrative Studies, 2011 - 2014

B.A., Environmental Troubleshooting

A self-designed, interdisciplinary Environmental Studies major, which includes work in business, spatial studies, economics, and cultural studies.

EXPERIENCE

Upper Mattaponi Indian Tribe | King William, VA

Environmental & Cultural Protection Director | December 2020-Current

- ♦ Oversee Environment & Culture Department, including natural resources, emergency management, and cultural preservation areas and staff.
- ♦ Serve as Tribe's technical and scientific rep on matters related to the environmental and cultural protection of UMIT.
- ♦ Design and implement policy, programming, and outreach strategies.
- ♦ Write, research, and manage grants; compliance; government consultation.
- ♦ Develop relationships and partnerships with local, state, and federal officials, organizations, and agencies.

University of Michigan | Ann Arbor, MI

Research Assistant | November 2018- May 2020

School of Environment and Natural Resources, Fischer Research Group

- ♦ Research on climate change adaptation among Midwest forest landowners, understanding the shifts in forest management and land use practices and their implications.
- ♦ Technical point person for the project, including administering the pilot and survey for over five thousand respondents, overseeing data collection, established workflow procedures and codebook development.
- ♦ Collected, managed, and analyzed the spatial database for the project including, developing geospatial sampling techniques and creating biophysical and exposure spatial variables via environmental stressors.
- ♦ Drafted, processed and reviewed case studies, reports, maps and technical documents.

Graduate Student Instructor | August 2019- December 2019 | Program in the Environment

- ♦ Updated and customized curriculum, prepared weekly lesson plans and coursework, provided feedback and guidance on assignments, responsible for course communication and the online platform.
- ♦ Facilitated 3 weekly recitation sections of 80 students, utilizing diverse techniques and methods on a wide range of sustainability topics.

The City of Ann Arbor | Ann Arbor, MI

Landscape Data Analyst | May 2019- August 2019 | Greenbelt Program

- ♦ Conducted landscape level GIS analysis of the Greenbelt Programs \$50 million land conservation portfolio.
- ♦ Researched, built and reported on multiple analyses, including extrapolating data critical to reporting on the Greenbelt Program's environmental impacts.
- ♦ Consulted with staff on how to best leverage these GIS analyses to integrate into programmatic operations, strategic planning and interdepartmental reporting on sustainability indicators. Performed work involving the collection compilation and tracking of data and statistical information to support the Program's operation.

- ◆ Prepared infographics, documents, maps and presentations for diverse stakeholders.

Oak Ridge National Laboratory | Oak Ridge, TN

Research Associate | January 2015 - November 2015 | Geographic Information Science & Technology Division

- ◆ Researched FETE (From Everywhere To Everywhere), a model that generates hypothetical pedestrian travel networks across landscapes.
- ◆ Conducted FETE algorithm performance characterization and improvement studies using a variety of geospatial datasets and initial conditions.
- ◆ Improved FETE accuracy and efficiency by incorporating human and physical geography data layers.
- ◆ Co-authored a white paper on potential FETE algorithm improvements, which incorporates population dynamics and distribution data.
- ◆ Prepared case studies, reports, and technical documents.

Hopi Archaeology Project & University of Redlands | Hopi, AZ & Redlands, CA

Field Assistant & Researcher | September 2013 - June 2014

Developed an independent research project focusing on geospatial analysis and modeling

- ◆ Performed comprehensive research on the Hopi people, human and physical geography, remote sensing and predictive models.
- ◆ Created a predictive model using remote sensing that resulted in successfully mapping archaeological resources associated with sand dunes.
- ◆ Harnessed GIS software's advanced tools and resources to ascertain and implement research.
- ◆ Conducted an archaeological survey, to validate existing data on the Hopi reservation.

University of Redlands | Redlands, CA

GIS Assistant | January 2012 - April 2013 | Sociology/ Anthropology Department

- ◆ Designed and developed GIS training material, troubleshooting guides, and labs.
- ◆ Provided technical support to students on GIS software and related applications.
- ◆ Collected, managed, and analyzed a variety data from difference sources.
- ◆ Generated maps, reports, imagery and related GIS products and service.

Teaching Assistant | September 2012 - April 2013 | Environmental Studies Department

- ◆ Prepared and delivered a variety of presentations to city council, the planning commission and general public.
- ◆ Contributed to Phase I & II Environmental Site Assessments.
- ◆ Created draft EIR (Environmental Impact Report) for commercial and residential properties as well as a wildlife corridor.
- ◆ Designed and created visualizations for development projects.

PUBLICATIONS & CONFERENCES

Anticipating the travel routes of internally-displaced persons and refugees in conflict zones: A case study from Syria, Conference on Complex Systems, presented paper in September 2015.

Fungal Decomposition of a model polycyclic aromatic hydrocarbon found in crude oils and its potential use in bioremediation, Southern California Conference on Undergraduate Research, presentation November 2015.

SPECIAL PROJECTS & ENDEAVORS

- ◆ Developed a CSA (Community Supported Agriculture) program proposal for the University of Redlands. Included crop planning and harvest schedules, a comprehensive business plan, as well as marketing and educational materials.
- ◆ Designed and constructed a medicinal and native plant garden with collaboration from the Sherman Indian High School in Riverside, CA.
- ◆ Cleveland Animal Care and Control Volunteer

Areas Affected by the Project

The York River watershed, including King William, King and Queen, Hanover, Caroline, New Kent, Gloucester, James City, Mathews, York, Middlesex, and Essex counties in Virginia will be included in this project proposal. However, the physical site will be located in King William, VA.

Manifest for Grant Application # GRANT13580599

Grant Application XML file (total 1):

1. GrantApplication.xml. (size 27719 bytes)

Forms Included in Zip File(total 6):

1. Form ProjectNarrativeAttachments_1_2-V1.2.pdf (size 16021 bytes)

2. Form SF424_3_0-V3.0.pdf (size 24176 bytes)

3. Form SF424A-V1.0.pdf (size 22991 bytes)

4. Form EPA4700_4_3_0-V3.0.pdf (size 22557 bytes)

5. Form OtherNarrativeAttachments_1_2-V1.2.pdf (size 16002 bytes)

6. Form EPA_KeyContacts_2_0-V2.0.pdf (size 37253 bytes)

Attachments Included in Zip File (total 9):

1. OtherNarrativeAttachments_1_2 OtherNarrativeAttachments_1_2-Attachments-1238-GMU EPA Letter of Support for UMIT.pdf application/pdf (size 122934 bytes)

2. OtherNarrativeAttachments_1_2 OtherNarrativeAttachments_1_2-Attachments-1239-Letter of support UMIT CAMG project 3252022.pdf application/pdf (size 83195 bytes)

3. OtherNarrativeAttachments_1_2 OtherNarrativeAttachments_1_2-Attachments-1240-Letter_Collaboration_ELind.pdf application/pdf (size 209017 bytes)

4. OtherNarrativeAttachments_1_2 OtherNarrativeAttachments_1_2-Attachments-1241-LM Resume.pdf application/pdf (size 301726 bytes)

5. OtherNarrativeAttachments_1_2 OtherNarrativeAttachments_1_2-Attachments-1242-BIO_ELind.pdf application/pdf (size 639180 bytes)

6. ProjectNarrativeAttachments_1_2 ProjectNarrativeAttachments_1_2-Attachments-1236-Air Appendix.pdf application/pdf (size 116233 bytes)

7. SF424_3_0 SF424_3_0-1234-Areas Affected by the Project.pdf application/pdf (size 3775 bytes)

8. ProjectNarrativeAttachments_1_2 ProjectNarrativeAttachments_1_2-Attachments-1235-Air Quality Grant (1).pdf application/pdf (size 723400 bytes)

9. OtherNarrativeAttachments_1_2 OtherNarrativeAttachments_1_2-Attachments-1237-Quality Assurance Statement.pdf application/pdf (size 234937 bytes)

COVERPAGE

Project Title: Tribal Community Air Quality Capacity Building and Monitoring Project

Applicant: Upper Mattaponi Indian Tribe

Address: 13476 King William Rd, King William, VA 23086

Primary Contact: Leigh Mitchell

Phone: (804)535-0561

Email: environment@umitribe.org

DUNS Number: 0811661900000

Set-Aside: Tribal Set-Aside

Brief Description of Applicant Organization: The Upper Mattaponi Indian Tribe is a recently federally recognized tribe. The Tribe and the is committed to serving its citizens, preserving its culture, and continuing stewardship of its homelands. The Environmental and Cultural Protection department's mission is to protect, conserve, and enhance Tribal natural resources for the benefit of the community.

Project Partners:

Virginia Department of
Environmental Quality
Contact: Charles Turner

Virginia Tech University
Contact: Dr. Elena Lind

George Mason University
Contact: Dr. Jeremy Campbell

Project Location: The Upper Mattaponi Tribal community and the greater York River watershed in Virginia.

Air Pollutant Scope: Ozone, PM2.5, Formaldehyde, PM10, Nitrogen Dioxide, and Sulfur Dioxide.

Budget Summary:

EPA Funding Requested	Total Project Cost
\$449,988	\$471,984

Project Period: September 30, 2022 - August 31, 2025

Short Project Description: The primary objectives of this project include building Tribal capacity to implement an air quality program by 1) training Tribal citizens in air quality knowledge and skills; 2) developing a community advisory board, 3) installation and maintenance of a Tribal Air Quality Monitoring Station, 4) assessment of Tribal community air quality and opportunities. This project leverages strategic partnerships, enabling the Tribe to gain the necessary training, tools, research, and support to bring data monitoring into the Tribe's decision making process, ultimately empowering them to better serve their community.

WORKPLAN

Section 1: Project Summary and Approach

A. Overall Project

The Upper Mattaponi Indian Tribe submits this application under the FY2022 Enhanced Air Quality Monitoring for Communities Grant opportunity. The Tribe is proposing a Community Scale Air Pollution Monitoring Project within its traditional lands, the York River watershed in the Commonwealth of Virginia. If successful, this application will enable the Tribe to build the capacity and knowledge to establish and maintain an air quality monitoring program. The project is intended to characterize the ambient concentrations of air pollutants, specifically aerosols (PM2.5 and PM10), Nitrogen Dioxide (NO2), Ozone

(O3), and formaldehyde (HCHO), hazardous air pollutants, as well as perform corresponding air quality assessments for the Upper Mattaponi Indian Tribal Community. Tribal citizens have long expressed concerns about air quality in the Tribe's homelands due to the siting of industrial facilities and encroaching development. *This capacity building project will fill a needed gap in air monitoring in the region while also enhancing the Tribal community's participation in the stewardship of the environment and its ability to address environmental and health disparities. The results of these objectives will inform Tribal decision-making and strategic planning to improve air quality and community health.*

The Upper Mattaponi Indian Tribe has reserved the right to continue to practice our ways of life within our homelands, which are now in parts of the York River watershed, specifically, King William, King and Queen, Hanover, Caroline, New Kent, Gloucester, James City, Mathews, York, Middlesex, and Essex counties in Virginia. UMIT citizens depend on the environment to meet spiritual, ceremonial, medicinal, subsistence, recreation, and economic needs. *A different force is now affecting our ability to hunt, fish, gather resources, steward the land and ultimately survive: pollution.* The Tribe is especially concerned about the possible impacts on human and environmental health caused by particulate matter (PM) from industrial sites, potentially elevated ozone and formaldehyde levels due to photochemical atmospheric processes.

The biggest challenge the Upper Mattaponi Tribal community faces when it comes to air quality is the *lack of data*. While there are over 40 regulated point source pollutant emission facilities and dozens of active mineral mines and timber sites all within the Tribal area (EJScreen 2.0, EnviroAtlas, and VA DMME), there is no air quality monitoring currently being done in the region. The closest facilities are the ozone-only monitoring stations maintained by the Virginia Department of Environmental Quality (DEQ) in Caroline and Hanover counties, over 25 miles from the Tribe's government center, and even further from the majority of UMIT citizens. There is a need to develop comprehensive air quality monitoring specifically within the York River watershed region. Compounding this issue, recent federal recognition means the Tribe also currently *lacks resources*—including knowledge, technical skill, and manpower—to contribute and participate in air quality monitoring and analysis. In order to address these needs, the Tribe proposes leveraging partnerships to build Tribal capacity in order to accomplish the following Primary Objectives:

- 1) Train 2 Tribal citizens in air quality knowledge and skills (air quality monitoring, instrumentation, equipment calibrations, station operations, regulations, emissions testing, pollution and health effects, data interpretation, and mitigation options) and the development of Tribal Environmental Advisory Board.
- 2) Collect data on air pollutants (PM2.5, Ozone, Formaldehyde, PM10, Nitrogen Dioxide, and Sulfur Dioxide) in the Tribal community with the implementation and maintenance of a suite of air quality monitoring equipment.
- 3) Evaluate the Tribal community's air quality by developing an air quality assessment and research to outline the continued monitoring and maintenance plan, SOPs, quality assurance measures, policy action plan, delegated programs roadmap, community health risk evaluation, partnerships, data gaps, and future funding opportunities.

Virginia Polytechnic Institute and State University (Virginia Tech), George Mason University (GMU), and the Virginia Department of Environmental Quality (DEQ) have committed to assisting the Tribe with all three of these project objectives. *Through these partnerships and this project, the Tribe will gain the necessary training, tools, research, and support to bring data monitoring into the Tribe's decision making process, ultimately enabling them to better serve their community.*

B. Regional Air Quality & Project Significance:

UMIT is located in the area potentially impacted by smog (high ozone concentrations and secondary aerosols, see **Fig. 1** center and right panel) in addition to direct emissions of particulate matter from local industry and transported from the Richmond metropolitan area (**Fig. 1** left panel). Formation of photochemical smog in the lower troposphere involves oxidation of volatile organic compounds (VOCs) in the presence of nitrogen oxides ($\text{NO}_x = \text{NO} + \text{NO}_2$) and sunlight. O_3 formation exhibits a non-linear dependence on highly variable precursors. Therefore, simultaneous measurements of O_3 , NO_x , and VOCs are required. Of the 187 hazardous air pollutants (HAPs) identified by the EPA, formaldehyde (HCHO) is a VOC and has the largest impact on human health, constituting roughly half of total HAP-related cancer risk (Strum and Scheffe, 2016). In the US, spatio-temporal patterns in HCHO concentrations and HCHO exposure are driven by oxidation of biogenic isoprene. We expect local HCHO enhancements due to emissions, transport and photochemistry on the Tribal lands.

Due to the known and suspected presence of air pollutants (e.g., $\text{PM}_{2.5}$) in the region, an assessment of the ambient air quality is needed to examine the possible health effects from these sources in this community. Additionally, health data suggests that the community has been disproportionately burdened by environmental risks. A significant portion of the Tribal community are below the federal poverty level. EPA's EJScreen identifies much of King William County in the 60-90th percentile for most EJ Index variables. including: 80-90th percentile for wastewater discharge, 70-80th percentile for Superfund proximity, 60-70th percentile for hazardous waste proximity, and 60-70th percentile for ozone. This assessment also ranks our region in the 90-95th percentile for low life expectancy, 70-80th percentile for asthma, and 80-90th percentile for 2017 air toxics cancer risks. Additionally, the 2017 National Air Toxics Assessment (NATA) indicates that Virginia's Middle Peninsula region has an average cancer risk of approximately 30 in a million due to Hazardous Air Pollutants (HAPs). **Figures 1** show the existing air quality monitoring in our region is exceedingly low. Currently, there is no O_3 , CO, NO_2 , SO_2 , $\text{PM}_{2.5}$, PM_{10} in or near the Tribal area (Middle Peninsula region). Furthermore, the center of Tribal community life—located along Virginia Route 30 in King William County—is surrounded by a number of large-scale industrial facilities, including a cat litter factory, a waste management facility, several sand and gravel mines, an open air clay mine, an airport, and timbering operations (Fig. 1 center panel).

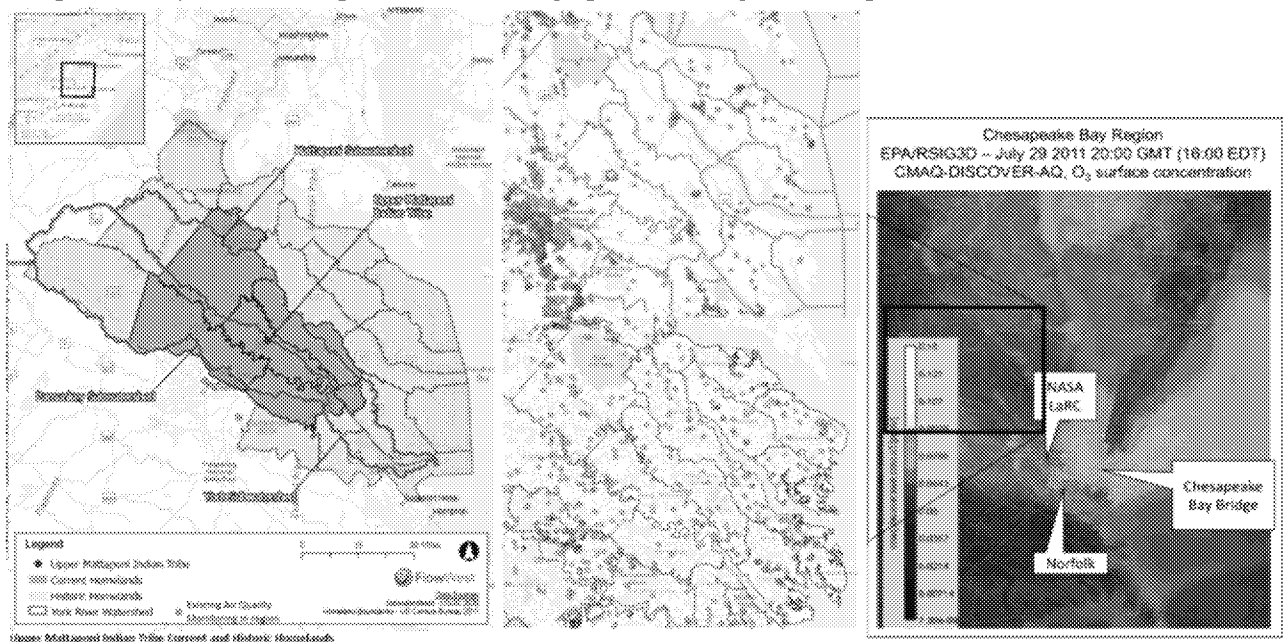


Figure 1: Left panel: The map on the left shows UMIT Tribal lands and existing air quality monitoring in the region. Center Top: The map shows regulated air pollution facilities (Enviro Atlas: ICIS-AIR, ICIS-AIR Major). Center Bottom: The figure on the bottom left shows active mineral

mining permits (VA DMME). Right panel: elevated CMAQ surface Ozone mixing ratio estimation during DISCOVER-AQ in and around the Tribal Homelands.

B. Project Significance

As indicated above and further elaborated in the Environmental Justice section of this proposal, the homelands of the Upper Mattaponi Indian Tribe potentially face air quality issues. The air quality assessment, and continued monitoring plan will provide important lessons and tools for the Tribe to contribute needed data and to improve air quality efforts across the watershed and provide a platform for the community to address these concerns. Not only will the Tribal community be supported but the wider community will benefit from the increased monitoring this project proposes. The Commonwealth of Virginia has significantly less air monitoring capacity than the surrounding states, and our partnership with the VA DEQ will work with the state to build out its network.

This proposed project aligns with the Tribe's EPA EPA-Tribal Environmental Plan (ETEP), which outlines the priority of establishing an Air Quality Program. This project would directly assist with goals of participating in air quality training, build air quality knowledge to participate in the regulatory process, and develop an air monitoring project. It also addresses a major community concern. The Tribe conducted a citizen census in 2021 which overwhelmingly identified air quality as a major environmental concern to the community, with over 70% of citizens saying air quality was a 'Very Important' environmental concern to them.

This project also aligns with and builds upon the Tribe's EPA Exchange Network grant that implements the technological systems necessary to efficiently acquire, manage, analyze and share environmental data through the establishment of a data management plan. The Tribe's intention is to use this funding opportunity to jump start an air program and work to secure additional funding to ensure the longevity of the program. Having trained staff to oversee the maintenance of the air monitoring will assure project sustainability. Part of this grant will also include a final report that will outline a roadmap of future funding sources the Tribe will pursue.

Section 2: Community Involvement

A. Community Partnership

The Upper Mattaponi Indian Tribe anticipates many opportunities for partnership during this project. This air quality monitoring and training project will leverage strategic partnerships so that the Tribe gains the necessary research training and support to bring data monitoring into the Tribe's decision making process. This partnership team is composed of interdisciplinary atmospheric physics and chemistry, cultural anthropology, and air monitoring experts who are committed to the study and wise management of air quality. UMIT will work directly with two universities, Virginia Tech and George Mason University, and a state agency, Virginia Department of Environmental Quality to assist the Tribe in the design and performance of the project, ultimately aiding in the Tribal community's capacity building. Moreover, this team represents the necessary partners to ensure data and regulatory cohesion of this project. This team is uniquely qualified to conduct the following tasks to advance the implementation of this project. They will provide a range of services, particularly technical assistance/expertise as indicated below:

Dr. Elena Lind, Assistant Professor of Electrical and Computer Engineering at **Virginia Tech**, has expertise in: (1) design, calibration, and deployment of UV-VIS spectroscopic ground-based remote sensing instruments for measuring trace gasses in the troposphere and stratosphere; (2) radiative transfer modeling of solar UV-VIS radiation propagation in the atmosphere; and (3) algorithm development for remote sensing data inversion (e.g., optimal estimation methods, analytical methods). She participated in multiple international and national field campaigns. She was part of the Pandora Project at NASA/Goddard Space

Flight Center and is currently PGN scientific advisor. Dr. Lind has extensive experience and expertise in data generation and distribution in standardized data formats. Dr. Lind will oversee calibration of the new Pandora instrument, coordinating instrument deployment, supervising a PhD student in Electrical Engineering on DOAS error evaluation and quality assurance. She will train the 2 Tribal citizens to maintain and interpret the NO₂, SO₂, HCHO and aerosol data from the air monitoring instrumentation.

Dr. Jeremy Campbell, Assistant Director for Strategic Engagement with the Institute for Sustainable Earth at **George Mason University**: Dr. Campbell is a cultural anthropologist who brings over two decades of community-based, participatory research and project management to this initiative. His research specialization is in cultural-based environmental knowledge in the Brazilian Amazon, and has also facilitated environmental education and tribal outreach programs in New England. In this project, Campbell will interface directly with tribal leadership to assist in designing and sustaining culturally-appropriate training materials for the Tribal trainees. He will also serve as a direct link to the human and technical resources at George Mason University, including data modeling and analysis capacities housed in the Department of Atmospheric Science. Campbell is also Co-PI on a parallel project, the *Indigenous Environmental Mapping and Resilience Planning in the Greater Chesapeake Project*, which is an intertribal partnership in which the Upper Mattaponi Indian Tribe is a lead collaborator.

Charles Turner, Manager, **Air Quality Monitoring at the Virginia Department of Environmental Quality**: The Office of Air Quality Monitoring is responsible for the installation, optimizing, operating, repairing, replacing and shutting down all air monitoring sites and site instrumentation for the Commonwealth of Virginia. Chuck Turner has managed the Virginia DEQ Office of Air Quality Monitoring for fifteen years. During this time, he has been responsible for the installation of multiple new monitoring sites including 2 Near Road sites, a National Air Toxics Trend site, 4 Lead (Pb) sites and a large multipollutant site in Hampton, VA. In this project, DEQ's Office of Air Quality Monitoring will assist the Tribe with selecting a suitable site for the monitoring effort and will assist in training the 2 Tribal citizens on the applicable Quality Assurance methods and techniques. This would be DEQ's first partnership with a federally recognized tribe which will help DEQ better understand the Tribal community.

The Upper Mattaponi Indian Tribe plans to maintain these relationships in the future by formalizing university and tribal research collaborations. The Upper Mattaponi hopes to develop a government-to-government relationship with the Virginia Department of Environmental Quality.

B. Community Engagement

In addition to the UMIT Government taking the lead in this project, the broader tribal community will participate significantly. Their involvement will include: hiring and training tribal citizens in air quality monitoring; community engagement activities to build understanding of air quality impacts on health; and the development of a Tribal Environmental Advisory Board. By conducting this project, UMIT, their partners and regional stakeholders will establish a working relationship with tribal citizens to address the community's concerns.

The Tribe will hire two tribal citizens that will gain technical training, develop and lead the local Tribal Environmental Advisory Board, develop community workshops and educational resources, assist with the research and reports. These tribal citizens will be trained in various air quality topics, specifically, air quality monitoring, instrumentation, equipment calibrations, regulations, emissions testing, pollution and health effects, data interpretation, and mitigation options by our project partners. With assistance from our partners with expertise in community-based research, we will also create a Tribal Environmental Advisory Board charged with supporting UMIT Government and incorporating community voice into this and related projects. The Board will meet quarterly and will be made up of at least 1 Tribal Council Member, 1 Tribal elder, 1 Tribal Citizen at large, 1 Tribal youth, the 2 Tribal citizen trainees and Environmental Director, thus

engaging many facets of the broader community. The Board will oversee how the Tribal community will participate in this project, receive environmental education and determine feedback systems. The Board will also facilitate data sharing with the community throughout the duration of this project. This will include updates in the Tribe's quarterly newsletter, hosting open forums and participatory trainings, and disseminating reports. Board members will receive a small stipend for their service and travel and will report meeting minutes to the Environmental Director.

UMIT has worked with many organizations and will continue to do so as the Tribe moves forward. The project partners will have recent involvement with the Tribal community. The Tribe has worked with VT on Tribal consultation and a tribal tourism assessment project. The UMIT Tribal community has also worked with VT on a hands-on geology project on Tribal lands. The Tribe and GMU successfully acquired a Summer Team Impact Grant to support the *Indigenous Environmental Mapping and Resilience Planning* project for the summer of 2022, which centers on tribal participation in citizen science initiatives.

Section 3: Environmental Justice and Underserved Communities

This project will promote environmental justice by meaningfully engaging the Tribal community through building capacity, restoring their environmental decision making power, and allowing the Tribe to have a seat at the table when projects may impact the community. The Upper Mattaponi Indian Tribe is a federally recognized Tribe based in King William County, Virginia. The Tribe was officially recognized by the commonwealth of Virginia in 1983 and received federal recognition in 2018.

Virginia tribes were some of the first tribes to experience contact with European settlers. When the British colonists arrived in 1607, the Upper Mattaponi were prosperous members of the Powhatan Chiefdom, residing in the ancestral lands of Tsenacommacah which encompassed the Tidewater and Eastern Shore regions of Virginia. By the mid-1600 there was a 90% population loss and tribes were forced to the upper reaches of the Mattaponi River. The Tribe were signatories to the Middle Plantation Treaty of 1677 as a tributary tribe, subject to the Queen of the Pamunkey, which led to more relocation and the establishment of a reservation of Chickahominy and Mattaponi Indians near Passapatan. During the 1700s, the Chickahominy moved back to their homeland. Those people who remained were ancestors of today's Upper Mattaponi. Virginia's Racial Integrity Act (1924) then moved to dissolve Indian identity by reclassifying Native Americans as "colored." Tribal citizens were unable to receive a high school diploma, marry outside their artificial race, or pursue economic development. That forced Native Americans in Virginia to move out of the commonwealth to more-receptive communities or to disguise their heritage.

The Upper Mattaponi, like all Virginia tribes, have faced incredible hardship, particularly from forced relocation, cultural assimilation and the paper genocide of Indian identity. These actions led to the delay of federal recognition and the current capacity needs of the Tribe. Given the near erasure of Native communities in Virginia, our communities continue to face threats to our traditional ways of life, culture, land, and ultimately, our survival. The centuries-long struggle of Native nations to maintain cultural identity and sovereignty has greatly contributed to the historical legacy of these communities. Nevertheless, Tribal communities, including the Upper Mattaponi Indian Tribe, have persisted, their knowledge and traditions living on through the generations.

The inland waterways of the York River watershed surround the Tribe's current Tribal center, with the Tribal Government operating in King William County (the Tribe owns 400 acres in the county). The Upper Mattaponi are water people, and the Chesapeake Bay, York River and its tributaries are our homelands and thus are essential to the Tribe's culture, livelihood and identity. Centuries of settlement, industrialization, mining, and manufacturing have not only shaped the physical landscape, but have also

impacted the minds and bodies of tribal citizens. Many of our citizens report health issues tied to environmental hazards which have only worsened with the COVID-19 pandemic.

The tribal government center is directly adjacent to a 40-acre cat litter factory site and 486-acre clay mine site. As of 2020, there were over 80 active mineral mining facilities in the Middle Peninsula region as well as extensive timber harvesting. The Tribal community is also being impacted by rapid and intense residential development associated with suburban sprawl from Richmond. These factors have combined to increase traffic, contributing to elevated levels of particulate matter and ozone in our area. As with other environmental justice communities throughout the state and nation, the Upper Mattaponi Indian Tribe has been relatively unable to participate in zoning decisions around the siting of industrial facilities, road or residential development projects, or other land- and water-use decisions that directly impact our people.

Section 4: Environmental Results—Outcomes, Outputs and Performance Measures

The goals and results of this project support EPA's Draft Fiscal Year (FY) 2022-2026 Strategic Plan *Goal 4: Ensure Clean and Healthy Air for All Communities, Objective 4.1 Improve Air Quality and Reduce Localized Pollution and Health Impacts* by directly increasing the capacity and implementing the necessary tools for the Tribe to participate in meaningful engagement for improved environmental outcomes. The outputs and outcomes of this project will facilitate and empower the Tribal community to improve air quality and reduce pollution. This project also supports the following EPA Strategic Plan goals and objectives: *Goal 2: Take Decisive Action to Advance Environmental Justice and Civil Rights, Objective 2.1: Promote Environmental Justice and Civil Rights at the Federal, Tribal, State, and Local Levels* by giving the Tribe the necessary tools to protect the community's health and environment.

The project's outputs, outcomes, performance measures and schedule are provided in Tables 1 and 2 below. More detailed descriptions of the outputs, their corresponding outcomes, performance measures and plans, and timeframe are described below.

A. Expected Project Outputs and Outcomes

Output 1: Air Quality Training of Tribal Citizens

During the implementation of this project, UMIT plans to collaborate with several organizations, including federal and state agencies, academia and community groups in order to receive the necessary knowledge and skills training to run an air quality program. Virginia Tech, GMU, and DEQ have committed to training 2 Tribal citizens in air quality monitoring, instrumentation, equipment calibrations, regulations and permitting, emissions testing, pollution and health effects, data interpretation, and mitigation options. The Tribal citizens will also pursue EPA air quality training as well as other relevant conferences, training, and certifications. **Outcome:** This output is essential to help build Tribal capacity to manage air quality concerns and future mitigation efforts by directly providing employment, knowledge and skills. This outcome will increase access to information and tools that increase understanding and reduction of environmental and human health risks. **Performance Measure & Timeline:** This output will be completed over 30 months and include tracking training hours, certifications, and a skills assessment.

Output 2: Creation of Tribal Environmental Advisory Board

The Tribe will create an advisory board to ensure community involvement of the project and assist with the outreach. The Board will be composed of 1 Tribal council member, 1 Tribal elder, 1 Tribal citizen at large, 1 Tribal youth, the 2 tribal citizen trainees and the Project Manager. The Board will oversee the Tribal community's participation in the project, receive environmental education, facilitate data sharing with the community, and host open forums. Environmental education on topics such as what air pollution is, how it is regulated and measured, and what a health risk assessment means will be run by the Tribal citizen. **Outcome:** This output is essential to not only ensure community participation throughout the project, but also build community awareness and education around air quality. There will also be increased access to information that increases understanding and reduction

of environmental and human health risks. **Performance Measure & Timeline:** This output will be completed within the first six months of the project but will continue over 30 months, which will include quarterly meetings of a diverse citizen group facilitated by the project manager and tribal citizen trainees. Minutes will be taken at each meeting to document participation, input and activities.

Output 3: Deployment of Air Quality Monitoring Equipment on Tribal Land (O3, PM2.5, HCHO, NO2, SO2, and PM10).

The Tribe will plan, purchase, and site air quality monitoring equipment on Tribal land in King William County. This output will deploy equipment to conduct Ozone, PM2.5, HCHO, NO2, SO2, and PM10 data in the Tribal community. The siting plan, deployment of monitoring equipment and calibration will be done in collaboration with VT and DEQ. The Tribe will also hire a contractor to prepare the site and build the necessary shelter for the equipment. The Tribe will install a Pandora Spectrometer System to measure the near surface concentrations and tropospheric columns of NO₂, SO₂, and HCHO, as well as a We propose to deploy a Teledyne Model 640x Real-Time Continuous PM Monitor and ozone monitor to measure PM2.5 and PM10, and O3. VT and DEQ will also provide calibration, maintenance, and operational training to UMIT trainees. **Outcome:** This output will directly supply the necessary equipment to address the Tribal community's air quality concerns, enabling the Tribe to access to tools that increase understanding and reduction of environmental and human health risks. **Performance Measure & Timeline:** This output will be completed over the first year of this project and will include tracking and reporting progress on expenditures and purchases.

Output 4: Near Real-Time Air Quality Data Availability/Database for the Tribal Community and other Local Stakeholders.

The collection of raw data from the equipment will be facilitated by UMIT with the assistance of VT, DEQ, and a QA Contractor. UMIT will work with a QA Contractor to ensure quality assurance and quality controls, develop SOPs and make sure the data aligns with the Tribe's Data Management Plan requirements. The monitoring equipment will be operated in accordance with all EPA quality control and quality assurance requirements. The Tribe will review DEQ's Quality Assurance Project Plans (QAPPs) and Standard Operating Procedures (SOPs) designed and approved for current programs as guidance. Data will be available to the Tribe and project partners. The Pandora system uses spectroscopy to study ultraviolet (UV) and visible wavelengths of light to determine the composition of the atmosphere and its interactions with Earth's environment. This remote sensing approach allows for total column and profile measurements.

Outcome: This output will result in a database of comprehensive air pollutant data useful for not only the Tribal community, but regional stakeholders, state agencies and future EPA modeling efforts. This would increase the Tribe's access to information that increases understanding and reduction of environmental and human health risks. This output would fill multiple gaps in monitoring data. The in-situ aerosol measurements will be uploaded to the state's database which will support Virginia's Annual Ambient Air Monitoring Report. **Performance Measure & Timeline:** This output will be completed over 27 months and include overseeing a QA consultant and working with the team to complete QA results from the sampler operations and data capture.

Output 5: Tribal Community Assessment of Air Pollution Data

The analysis of Tribal air quality will be conducted in partnership with VT and GMU, which have extensive expertise in environmental analysis. The data will be analyzed by UMIT with the support from VT and GMU student researchers to develop a Tribal community assessment of air pollution data and any other relevant research. The air quality assessment will be guided by the input from the Tribal Board. This assessment will be shared with the Tribal community and be used to inform Output 6. The Tribal Board will also work to outline specific research questions for continued collaborative research. **Outcome:** This output will enable the Tribe to develop analysis and research skills, and begin to identify air quality problems in the community. **Performance Measure & Timeline:** This output will be completed over 18 months and will include at least quarterly meetings with project partners, Tribal citizen trainees, the Tribal Board, and Project Manager.

Output 6: Final Project Report

UMIT will develop a comprehensive final project report that includes an abbreviated Tribal air quality assessment, and outlines the continued monitoring and maintenance plan, SOPs, quality assurance measures, policy action plan, delegated programs roadmap, community health risk evaluation, partnerships, data gaps, and future funding opportunities. The partners will supplement any resources the Tribe may need to complete this report. This report will help guide the Tribal community to protect the environment and citizens and outline the sustainability of the program. **Outcome:** This output will result in Tribal policy action(s) to mitigate certain air pollutants. This report will be used to inform future air quality opportunities. is the first build the foundation to which the Tribe can build future reduction of a **Performance Measure & Timeline:** This report will be compiled over the final year of the project with quarterly progress reports.

Table 1: These outputs and outcomes combined make up the foundational elements for the Tribal to facilitate the reduction in ambient emissions, concentrations, and human exposure of air pollutants in the community.

Outputs	Outcomes	Performance Measures
Output 1: Air quality training of Tribal citizens	Increased access to information and tools that increase understanding and reduction of environmental and human health risks.	Skills assessment, training hours and certifications completed.
Output 2: Creation of Tribal Environmental Advisory Board	Increased community awareness.	Installation of a diverse 7-member Board by Summer 2023, with quarterly reports including minutes, participation, and areas addressed.
Output 3: Deployment of air quality monitoring equipment on Tribal land (Ozone, PM2.5, HCHO, NO2, SO2, and PM10).	Increased access to tools that increase understanding and reduction of environmental and human health risks.	Tracking and reporting progress on expenditures and purchases.
Output 4: Near real-time air quality data availability/database for the Tribal and other local stakeholders.	Increased access to information that increases understanding and reduction of environmental and human health risks.	Meet data capture requirements for all pollutants. Meet all required QA requirements and manufacturer's recommended work practices
Output 5: Tribal community assessment of air pollution data	Problem identification.	Minimally, quarterly meetings with partners, Board and Project Manager throughout the project.
Output 6: Final project report	Tribal policy action(s) to mitigate certain air pollutants.	100% of progress reports completed on time.

B. Performance Measures and Plan

The Tribe has an internal mechanism to track, measure, and report progress toward achieving the expected outputs and outcomes. The Project Manager (PM) will be responsible for ensuring the progress and completion of all outputs, evaluating the results. Additionally, the PM will complete and submit the quarterly and final reporting requirements per the grant guideline. Descriptions on how the results of the project will be evaluated are listed above (Table 1) and also summarized under each output in the previous section. All data collected during the project will follow EPA procedures when applicable.

C. Timeline and Milestones

The Table below outlines the timeline and milestones of this project. The PM, Tribal trainees and partners will work collaboratively to complete these tasks over the proposed timeline. Tasks are organized by output. Table 2 and Milestones.

Output Addressed	Task	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Hire 2 Tribal citizens												
1, 5, & 6	Air quality training and management												
2	Create Tribal Environmental Advisory Board												
2	Tribal Environmental Advisory Board meetings												
3	Research & select air monitoring equipment												
3	Purchase air monitoring equipment												
3	Hire installation Contractor												
2	Site air monitoring equipment												
4	Hire QA Consultant												
4	Develop QAPP, SOPs, & data alignment												
1 & 4	Collect air quality data												
4	Data validation and summary												
1 & 5	Tribal community air assessments and research												
1 & 6	Final project report												
all	Prepare and submit grant reports												

Section 5: Quality Assurance Statement

See attached Quality Assurance Statement.

Section 6: Programmatic Capability and Past Performance

A. Past Performance & Reporting Requirements

As a recently federally recognized tribe, federally funded assistance agreements UMIT currently have are still active. UMIT has successfully received and managed grants from the CDC, HUD, BIA and EPA. While these grants are currently ongoing, the Tribe continuously meets reporting requirements but has yet to submit final technical reports given their status. The Tribe has policies and procedures in place to ensure the successful reporting and financial management of grants. The Tribe completed its first external audit for FY 2020 and received an unqualified opinion on the financial statements from PBMares. Moreover, it found that based upon past experience, no provision has been made in the accompanying financial statements for the refund of grant monies.

The Tribal successfully received the EPA Exchange Network grant to develop a data management plan to outline a virtual exchange service for environment data. If this project is successful, air quality data collected as part of this project will be compiled, processed, and uploaded to the US EPA air quality database.

B. Staff Expertise

Project Manager: Leigh Mitchell, Environmental & Cultural Protection Manager. She was selected for the role based on her academic background, experience working collaboratively with tribes and non-tribal entities, and ability to manage environmental projects. Leigh's project roles and responsibilities will include:

- Ensuring timely completion of project deliverables
- Leading overall Tribal coordination
- Hiring & Managing Tribal citizen trainees
- Procuring contractors
- Performing quarterly and final reports

Tribal Citizen Trainees: UMIT will use a portion of this grant to hire key personnel. The successful candidates will have bachelor's degree in the field(s) of: environmental science, geography, chemistry, ecology, engineering or related field. They will have 2+ years of experience with environmental data collection and management. VT, GMU, and DEQ and other stakeholders have committed to providing training and field experience to 2 tribal citizens in a plethora of air quality activities over the course of 30 months. The role that is being hired for is 1 full environmental technician and 1-part time environmental technician. They will be responsible for:

- Leading Tribal outreach
- Coordinating with Partners
- Output 2: Creation of Tribal Environmental Advisory Board

Output 3: Deployment of Air quality monitoring equipment on Tribal land
Output 4: Near real-time air quality data availability/database for the Tribal community and other local stakeholders.

Output 5: Tribal community assessment of air pollution data
Output 6: Final project report

Partners & Consultants: The project manager will work with the 3 project partners and 2 consultants to complete the various outputs. Specifically, Dr. Elena Lind will assist with Outputs 1, 3, 4 and 5; Dr. Jeremy Campbell will assist with Outputs 1, 2 and 5; and Mr. Charles Turner will assist with Outputs 1, 3, 4 and 5. The consultant is responsible for all QA and Output 4. *Please see the attached Appendix for Project Team Biography.*

Section 7: Budget

A. Budget Detail & Reasonableness of Costs

The total budget for this project is \$449,988 in direct grant funding. The budget includes a total of \$409,080 in direct costs, comprising of \$146,016 for personnel, \$37,964 for fringe, \$114,000 for equipment, \$27,000 for supplies, \$17,200 for travel, \$31,900 for other, and 35,000 for contacts. The Tribe's indirect costs for this project are \$40,908. There are \$22,152 of in-kind funds provided by partners. The following are details including reasonableness of costs of the funding request for the proposed project:

Personnel

Budget estimate Tribal of staff in the following classifications: (1) Environmental & Cultural Protection Director; (2) Tribal Trainees (Environmental Tech and Air Tech). The Environmental Director is the Project Manager and will oversee the completion of the Training and ensure timely completion of project deliverables. The Tribal Air Tech Trainee will assist on all aspects of this project in a full time capacity. The Tribal Environmental Tech Trainee will also assist in all objectives of this project but in a part time capacity. As the Tribe is in a capacity building stage, hiring key personnel will be essential to this success of the project.

In Kind: Virginia Tech, George Mason University and Virginia Department of Environmental Quality staff have generously agreed to provide Tribal trainees with 30 months of air quality training. This will require an average of 0.025 FTW to complete. Valuation provided by partners.

Fringe Benefits;

Fringe components consist of: worker's compensation (6%), FICA (7.65%), SUTA (2.51%), and payroll taxes (9.84%).

Equipment

Equipment includes a suite of equipment that will provide the Tribe with the necessary equipment to comply with EPA standards but also address the community's pollutant concerns. The Pandora Spectrometer System was designed to specifically look at levels of ozone, nitrogen dioxide and formaldehyde in the atmosphere. What makes the Pandora unique from other ground-based networks at NASA is that it can measure total column profiles, observing different layers of the atmosphere at once. The T640X PM10/PM2.5 continuous sampler, PM10Sampler, and Ozone analyzer will address the PM2.5, PM10, and Ozone aspects of the air quality monitoring objectives. The 8871 Data logger is necessary for DEQ's Data Acquisition System, so the Tribe is able to upload data to DEQ's web page.

Supplies

Budget estimates include the needed supplies to supplement the air quality equipment such as cabling, router, weather station, flow check verification hardware, and backup timer; general office supplies for the tribal trainees to complete the various objectives, such as desk, chairs, laptops and software, etc.; and the necessary air quality maintenance supplies to ensure the continuation of air monitoring such as filters, calibration supplies, and full sky

camera, and portable sensor. The weather station and full sky camera will help spark interest in the project and help ensure the safety of the equipment.

Travel

Tribal Trainee's will attend meetings, conferences and training related to air quality management. Travel costs were estimated to include transportation, lodging, and meals and incidental expenses based on the per diem following the Federal U.S. General Services Administration guidelines. The 2 tribal trainees will attend the EPA Air Pollution Training Institute and visit the Eastern Band of Cherokee Air Quality Management department to learn about their program. The 2 tribal trainees will also attend the annual National Tribal Forum on Air Quality and National Ambient Air Monitoring Conference. Finally, travel will cover the mileage for the siting and installation and maintenance and repair of the air quality equipment over the course of this project.

Contractual

As a recently federally recognized tribe, the Tribe has limited capacity and looks to consultants to fill gaps. UMIT will hire one consultant to complete the QA tasks and provide technical QA training. Outputs to be completed by the contractor include Output 4: Near real-time air quality data availability/database for the Tribal and other local stakeholders and some of Output 1: Air quality training of tribal citizens. The contractor will provide quality assurance on the air quality monitoring data and ensure quality control practices are applied during this project. The contractor will also train UMIT staff on maintaining QA on the data to ensure the longevity of the project after completion of this funding. The contractor will complete necessary QAPP and help develop SOPs. UMIT will also hire an Equipment Installation contractor to assist in the ground preparation and construction of the air quality monitoring equipment on Tribal land. The data logger, T640Xr and ozone monitoring equipment will have to be installed in a shelter.

Other

To ensure community input in this project, the Tribe will develop a Tribal Environmental Advisory Board that will include a stipend of \$85 per meeting x 10 meetings (quarterly meetings over 30 months) x 4 citizens. This Tribal Environmental Advisory Board will be made up of a diverse group of citizens who will receive a stipend for time and travel as well as the Tribal Trainee's and Environmental Director. This Board will ensure community involvement is woven in throughout all aspects of this project.

The Tribe will also conduct Tribal community engagement activities that need funds to cover meeting space and publication and distribution of materials. University student research stipends will be disbursed to Virginia Tech and George Mason students to assist the Tribe in completing Output 3: Deployment of Air quality monitoring equipment on Tribal land; Output 4: Near real-time air quality data availability/database for the Tribal and other local stakeholders; and Output 5: Tribal community assessment of air pollution data. The Tribe will coordinate with each university's corresponding project partner to assign a student researcher to support the Tribe with these objectives. This collaborative research support will be provided over 15 months. It is part of the Tribe's goal to build community partnerships and support youth education.

The monitoring equipment will require electric operating costs.

Indirect Cost

Indirect Cost Rate - The Upper Mattaponi Indian Tribe accepts a 10% de minimus rate as the Indirect Cost Rate since the Tribe has not negotiated an indirect cost rate and does not have one in negotiation at this time.

Table 3: Proposed Budget

Category	Rate	Hours	FTE	Timeframe	Task(s) Complete	Cost (\$)
Personnel (\$/hr)						
Environmental Director	\$32	468	0.075	36 months		\$14,376
Tribal Citizen Air Tech Trainee	\$17	5200	1	36 months		\$88,400
Tribal Citizen Environmental Specialist	\$21	2080	0.4	36 months		\$42,840
Subtotal						\$146,016
Fringe (26% of cost)						
Workers Comp (6%), FICA (7.65%), SUTA (2.5%), Payroll Taxes (9.84%)						\$27,964
Equipment						
Pandora Station						\$50,000
PM10 Sampler						\$5,600
T640X PM10/PM2.5 continuous sampler						\$37,000
8871 Data logger						\$8,400
Ozone analyzer						\$10,000
Subtotal						\$114,000
Supplies						
2 Laptops and Software						\$5,500
Office supplies (Desk, chair, etc.)						\$4,900
Back up digital timer						\$800
Calibration/Audit supplies						\$1,000
Flow check verification hardware						\$1,500
Field temperature and measurement hardware						\$950
Filters						\$2,900
Router/modem						\$950
Cabling, brushes, electrical supplies						\$1,500
Sensor						\$3,000
Weather station						\$3,000
Full Sky Camera						\$1,800
Purple Air PA-II-SD						\$300
Subtotal						\$27,000
Travel						
National Tribal Forum on Air Quality						\$6,200
Eastern Band of Cherokee- Air Quality Management						\$2,000
National Ambient Air Monitoring Conference						\$3,000
EPA Air Pollution Training Institute						\$3,500
Spring and Installation (8 visits: VDEQ & VT to UMIT)						\$1,000
Maintenance and repair travel (estimated 4 visits)						\$1,000
Subtotal						\$17,200
Other						
Stipend costs (university student research stipends)				17 months		\$25,000
Advisory Board stipend (quarterly meetings x 2.5 years)				30 months		\$3,400
Tribal engagement activities						\$2,500
Electrical operating costs						\$1,000
Subtotal						\$31,900
Contractual						
Environmental Consultant (QA and regulatory compliance)				2 years		\$20,000
Equipment Installation (ground preparation, power installation, utility connect)				6 months		\$15,000
Subtotal						\$35,000
Match						
In Kind: VDEQ	\$48	156	0.025	36 months		\$7,176
In Kind: VT	\$48	156	0.025	36 months		\$7,488
In Kind: GMLI		156	0.025	36 months		
Subtotal						\$14,664
Total Direct Cost						\$403,080
Total Indirect Cost (De Minimis 10%)						\$40,308
Total Project Cost						\$443,388

B. Expenditure of Awarded funds

The Upper Mattaponi Tribal Council approved Grant Management Policies and Procedures #22-01 with an effective date of October 2021. Section C, 7 of the procedures requires monitoring of the period of performance, to include ensuring that grant funds are spent timely.

References

EPA EJScreen. www.epa.gov/ejscreen

EPA EnviroAtlas. <https://enviroatlas.epa.gov/enviroatlas/interactivemap/>

Platt, U. and Stutz, J. (2008). Differential optical absorption spectroscopy: principles and applications. Physics of Earth and space environments. Springer, Berlin.

Strum, M. and Scheffe, R. (2016). National review of ambient air toxics observations. Journal of the Air & Waste Management Association, 66(2):120–133.

VA DMME Geology and Mineral Resources. Retrieved March 24, 2021.

<https://energy.virginia.gov/webmaps/GeologyMineralResources/>

Virginia Department of Environmental Quality (2021). Annual Ambient Air Monitoring Network Plan.

NAME: Elena Spinei Lind

POSITION TITLE & INSTITUTION: Assistant professor, Virginia Polytechnic Institute and State University

A. PROFESSIONAL PREPARATION

(see PAPPG Chapter ILC.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Moldova State University	Chisinau, Moldova	Chemistry and Chemical Technology	Diploma	1998
University of Idaho	Moscow, Idaho	Environmental Engineering	MS	2002
Washington State University	Pullman, Washington	Civil Engineering/Remote sensing of trace gases in atmosphere	PhD	2010
Washington State University	Pullman, Washington	Remote sensing of trace gases in atmosphere	Post doctorate	2010-2012

B. APPOINTMENTS

(see PAPPG Chapter ILC.2.f.(i)(b))

From - To	Position Title, Organization and Location
2017 - present	Assistant professor, Virginia Polytechnic Institute and State University, Blacksburg, VA
2012 - 2017	Research Associate, ESSIC, University of Maryland, College Park, MD
1999 - 2000	Chemistry Lecturer, Community College of Computer Science, Chisinau, Moldova

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

Please note that publishing as Elena Spinei

1. E. Spinei, et al. Effect of polyoxymethylene (POM-H Delrin) off-gassing within the Pandora head sensor on direct-sun and multi-axis formaldehyde column measurements in 2016–2019. *Atmospheric Measurement Techniques*, 14(1): 647–663, Jan. 2021. ISSN 1867-8548. doi: 10.5194/amt-14-647-2021
2. J.-L. Tirpitz, et al. Intercomparison of MAX-DOAS vertical profile retrieval algorithms: studies on field data from the CINDI-2 campaign. *Atmospheric Measurement Techniques*, 14(1):1–35, Jan. 2021. ISSN 1867-8548. doi: 10.5194/amt-14-1-2021. <https://amt.copernicus.org/articles/14/1/2021/>
3. K. Kreher, et al. Intercomparison of NO₂, O₂O₂ and HCHO slant column measurements by MAX-DOAS and zenith-sky UV–visible spectrometers during CINDI-2. *Atmospheric Measurement Techniques*, 13(5): 2169–2208, May 2020. ISSN 1867-8548. doi: 10.5194/amt-13-2169-2020. <https://amt.copernicus.org/articles/13/2169/2020/U>.
4. Frieß, S. et al. Intercomparison of MAX-DOAS vertical profile retrieval algorithms: studies using synthetic data. *Atmospheric Measurement Techniques*, 12(4):2155–2181, Apr. 2019. ISSN 1867-8548. doi: 10.5194/amt-12-2155-2019. <https://amt.copernicus.org/articles/12/2155/2019/>
5. E. Spinei, et al. The first evaluation of formaldehyde column observations by improved Pandora spectrometers during the KORUS-AQ field study. *Atmospheric Measurement Techniques*, 11(9):4943–4961, Aug. 2018. ISSN 1867-8548. doi: 10.5194/amt-11-4943-2018. <https://amt.copernicus.org/articles/11/4943/2018/C.R>.

Other Significant Products, Whether or Not Related to the Proposed Project

1. C. R. Nowlan, et al. Nitrogen dioxide and formaldehyde measurements from the GEOstationary Coastal and Air Pollution Events (GEO-CAPE) Air-borne Simulator over Houston, Texas. *Atmospheric Measurement Techniques*, 11(11):5941–5964, Oct. 2018. ISSN 1867-8548. doi: 10.5194/amt-11-5941-2018. <https://amt.copernicus.org/articles/11/5941/2018/>
2. E. Spinei, et al. The use of NO₂ absorption cross section temperature sensitivity to derive NO₂ profile temperature and stratospheric–tropospheric column partitioning from visible direct-sun DOAS measurements. *AMT*, 7(12): 4299–4316, Dec. 2014. ISSN 1867-8548. doi: 10.5194/amt-7-4299-2014.
3. E. Spinei, S. et al. Validation of ozone monitoring instrument SO₂ measurements in the Okmok volcanic cloud over Pullman, WA, July 2008. *Journal of Geophysical Research*, 115:D00L08, Sept. 2010. ISSN 0148-0227. doi:10.1029/2009JD013492.

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

1. Member of the Board of Advisors for Environmental Engineering BS program at Navajo Technical University (since 2020)
2. Member of the scientific advisory committee for the 9th International Differential Optical Absorption Spectroscopy Workshop, 13-15 July 2020, Utrecht (held virtually).
3. Remotely teaching introduction to computing using Python language to a small group of Native American high school students at the Greyhills Academy High School, Tuba City, Arizona (after school, non credit).
4. Promoting undergraduate student research through Virginia Tech programs such as Galipatia
5. Promoting STEM to diverse groups by giving lectures to Virginia Tech programs such as CEED and off campus local schools.